

ORB-WEAVING SPIDERS *ACTINOSOMA*, *SPILASMA*, *MICREPEIRA*, *PRONOUS*, AND FOUR NEW GENERA (ARANEAE: ARANEIDAE)

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ABSTRACT. *Actinosoma* contains one species, *A. pentacanthum*. *Spilasma* has three species, two of which are new. *Micrepeira* has seven species, of which five are new. *Pronous* has 14 species, of which 11 are new. The new genera are *Spinepeira*, with one new species known only from a female; *Hingstepeira*, with four species, three of them new; *Madrepeira*, with one new species; and *Tatepeira*, with four species, three of which are new and of doubtful generic placement. There is one new generic synonymy and 11 new synonymies of species names. Species of all these genera are known only from the Americas.

The species of several of these genera make unusual webs. *Actinosoma pentacanthum* lives over water on emergent vegetation. *Hingstepeira*, *Spilasma*, and *Micrepeira* build retreats into the web. *Madrepeira* makes a ladderweb. Most of these spiders are rarely collected. The names used by R. W. G. Hingston in his observations on unusual webs are identified.

INTRODUCTION

This is one of a series of papers revising Neotropical araneid orb weavers. Previous papers are listed in Levi (1993a). Since 1993, revisions of *Lewispeira* Levi (1993b), *Kaira* O. P.-Cambridge (Levi, 1993c), and *Acacesia* Simon (Glueck, 1994) have been published.

This paper is dedicated to those collectors who contributed specimens with photographs of their webs. They are W. Eberhard, J. Coddington, H. Höfer, and R. L. C. Baptista. Without their photographs and notes on web structure, this revision would lack important data. The photographs made it possible to place many of the species named by Hingston (1932) in his book on Guyana spiders. Hingston did not in-

tend to describe new species and did so only because no keys were available and nobody could name the spiders whose unusual webs he had observed and illustrated. (See Note, p. 209.)

Among the species described here are many that probably are quite common but are rarely collected. *Actinosoma* occurs on emergent vegetation and is known to dive and run over water if disturbed. Spider collectors are usually not equipped with waders or boats, and the knowledge that schistosomiasis occurs in areas in the Lesser Antilles, northern Venezuela, coastal Surinam, and eastern Brazil (IAMAT, 1992) further deters arachnologists from splashing in ponds.

Pronous may be equally difficult to collect. More than half of the available specimens were picked up by A. M. Chickering. *Pronous* makes a small web in leaf litter and disappears into litter at the slightest disturbance. Presumably by spending much time sifting leaf litter, Chickering got more specimens than other collectors.

The genera in this revision are not closely related. *Actinosoma* has a paramedian apophysis, the conductor is in the middle of the tegulum area, there are no spines on the median apophysis, and there is no distal hematodocha (Fig. 9); in the female the epigynum is a broad lobe (Figs. 1–3). The characters cited are synapomorphies with *Alpaida* O. P.-Cambridge (Levi, 1988). *Tatepeira*, the other extreme, lacks a paramedian apophysis and has the conductor on the side of the tegulum, and the median apophysis has spines and well-de-

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TABLE 1. SOME CHARACTERS OF SPECIES BELONGING TO GENERA REVISED HERE, WITH OTHER GENERA INCLUDED FOR COMPARISON.

	ACT	ALP	SPI	HIN	MCA	PRO	MEP	SPL	ACA	MAD	AM	TAT	ARA	NEO
PME	—	—	—	[+]	—	[+]	—	—	—	—	—	—	—	—
head	—	—	—	—	[+]	—	—	+	+	—	—	—	—	—
IV > I	—	—	—	—	+	+	—	—	—	—	—	—	—	—
abd.shape	[+]	—	[+]	[+]	[+]	[+]	[+]	—	—	[+]	[+]	[+]	—	—
abd.pttrn.	+	—	—	—	—	—	—	[+]	[+]	—	—	—	—	—
abd.spins.	+	—*	—	—	—	—	—	—	—	—	—	—	—	—
epig.lobe	+	+	+	+	+	—	[+]	+	+	—	—	—	—	—
epig.scp.	—	—	—	—	—	—	[+]	—	—	+	+	+	+	+
scape pnt.	—	—	—	—	—	—	[+]	—	—	—	+	+	—	—
scape pck.	—	—	—	—	—	—	—	—	—	—	—	—	+	+
♂ dwarf	—	—	?	—	+	+	—	+	—	—	—*	—	—*	—
♂ abdom	—	—	?	—	+	+	—	[+]	—	—	—	—	—	—
patella	1	1*	?	1	1	1	1	1	1	2	2*	2	2*	2
M tooth	—	—	?	—	—	—	+	—	—	+	+	+	+	+
flagella	—	—	?	—	—	—	+	—	—	—	+	+	—	—
PM	+	+	?	+	+	?	—	?	+	—	—	—	—	—
C on edge	—	—	?	—	—*	—	—	—	—	+	+	+	+	+
DH	—	—	?	—	—	—	—	—	—	+	+	+	+	+
A	+	+	?	+	+	—	—	—	+	+	+	+	+	+
A cplx.	—	+	?	—	—	—	—	—	—	+	+	+	+	—

Genera: ACA, *Acacesia*; ACT, *Actinosoma*; ALP, *Alpaida*; AM, *Amazonipeira*; ARA, *Araneus*; HIN, *Hingstepeira*; MAD, *Madrepeira*; MCA, *Micrathena*; MEP, *Micrepeira*; NEO, *Neoscona*; PRO, *Pronous*; SPI, *Spinepeira*; SPL, *Spilasma*; TAT, *Tatepeira*. Revised genera are set in *italic*.

Abbreviations: PME, posterior median eyes modified; head, cephalic region modified; IV > I, leg 4 longer than leg 1; abd.shape, abdomen shape modified; abd.pttrn., abdomen pattern modified; abd.spins., median posterior spines or tubercles present; epig.lobe, epigynum a lobe; epig.scp., epigynum with scape; scape pnt., scape tip pointed; scape pck., scape tip with distal pocket; ♂ dwarf, male dwarfed and may lack endite tooth, coxal hook; ♂ abdom, male abdomen modified with ventral scutum; patella, palpal patella with 1 or 2 setae; M tooth, median apophysis with tooth; flagella, median apophysis with flagella; PM, paramedian apophysis; C on edge, conductor on edge of tegulum; DH, distal hematodocha present; A, terminal apophysis present; A cplx., terminal apophysis branched. +, present; [+], an autapomorphy of genus; —, absent; *, variable in some species.

veloped distal hematodocha (Fig. 224); the female has an epigynum with an annulated scape (Figs. 217–219) and a pair of humps on the abdomen (Fig. 220). These characters all are synapomorphies with *Araneus* and *Aculepeira*. Other genera here, *Pronous*, *Micrepeira*, and *Spilasma*, have some intermediate characters (Table 1).

Readers of manuscripts often suggest that more information on apomorphies should be provided for construction of cladograms. But while some help can be given, the judgment about what is a good apomorphy is subject to reconsideration and relies on knowledge of other genera, some not yet revised. A study of relationships and useful apomorphies will be in order at the end of the revisions. Some

examples of recent changes follow: Earlier it was thought that the presence of one or two macrosetae on the male palpal patella was useless in phylogeny and was not used. Now, however, despite many exceptions, it appears that the *Araneus* group of genera generally has two macrosetae, while those close to *Alpaida* have one (Table 1). In another example, the usual armature of araneid males, such as an endite tooth, a hook on the first coxa, or the modified second tibia seems to be lost in males that are very small compared to the female [with many exceptions, e.g., *Acanthepeira* Marx (Levi, 1976)]. At present, such armature is of little use in phylogeny. Another case of changed value concerns the pointed scape of the epigynum and the paired flagella of

the median apophysis in the male palpus, formerly considered a synapomorphy for about five genera close to *Araneus*. But now these features are also noted in *Micrepeira* (Fig. 162, M in Fig. 179), which otherwise is close to *Alpaida* O. P.-Cambridge (Levi, 1988). At this stage the best information that can be provided is limited to the autapomorphies of individual revised genera.

MATERIALS AND ACKNOWLEDGMENTS

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- | | | | |
|-------|---|------|---|
| AD | A. Dean, College Station, Texas, United States | MCP | Museu de Ciências, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil; E. H. Buckup |
| AMNH | American Museum of Natural History, New York, United States; N. Platnick, L. Sorkin | MCZ | Museum of Comparative Zoology, Cambridge, Massachusetts, United States |
| BMNH | Natural History Museum, London, England; P. Hillyard, F. Wanless | MECN | Museo Ecuatoriano de Ciencias Naturales, Quito, Ecuador; L. Avilés |
| CAS | California Academy of Sciences, San Francisco, California, United States; W. J. Pulawski, D. Ubick, C. Griswold | MEG | M. E. Galiano; Buenos Aires, Argentina |
| DU | D. Ubick, San Francisco, California, United States | MHNG | Muséum d'Histoire Naturelle, Genève, Switzerland; V. Mahnert |
| FMLT | Fundacion Miguel Lillo, Tucumán, Argentina; J. A. Corronca | MIUP | Museo de Invertebrados, Universidad de Panamá, Panama; D. Quintero A. |
| FSCA | Florida State Collection of Arthropods, Gainesville, Florida, United States; G. B. Edwards | MNHN | Muséum National d'Histoire Naturelle, Paris, France; J. Heurtaut, C. Rollard |
| HECO | Hope Entomology Collections, Oxford University, Oxford, England; I. Lansbury, M. Atkinson | MUSM | Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru; D. Silva D. |
| INPA | Instituto Nacional de Pesquisas da Amazônia, Manaus, Est. Amazonas, Brazil; C. Magalhaes | MZCR | Museo Zoologico de Universidad de Costa Rica, San José, Costa Rica; C. E. Valerio |
| IRSNB | Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium; L. Baert | MZSP | Museu de Zoologia, Universidade de São Paulo, São Paulo, SP, Brazil; P. Vanzolini, J. L. Leme |
| JAK | J. A. Kochalka, Ciudad Universitaria, Paraguay | MZUF | Museum Zoologico de La "Specola," Università di Firenze, Florence, Italy, L. Bartolozzi, S. Mascherini |
| MACN | Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina; E. A. Maury | NMB | Naturhistorisches Museum, Basel, Switzerland; E. Sutter, A. Hänggi |
| MCN | Museu de Ciências Naturais, Fun- | NRMS | Naturhistoriska Riksmuseet, Stockholm, Sweden; T. Kronstedt |
| | dação Zoobotânica do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil; A. A. Lise | PAN | Polska Akademia Nauk, Warszawa, Poland; J. Prószyński, A. Słowjewska, E. Kierych |
| | | REL | R. E. Leech, Edmonton, Alberta, Canada |
| | | RLCB | R. L. C. Baptista, Rio de Janeiro, Brazil |
| | | SMF | Forschungsinstitut Senckenberg, Frankfurt am Main, Germany; M. Grasshoff |

- UCVC Universidad Central de Venezuela, Caracas, Venezuela; J. Racenis
 USNM National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States; J. Coddington, S. F. Larcher
 ZMK Zoologisk Museum, Copenhagen, Denmark; H. Enghoff
 ZSM Zoologische Staatssammlung, Munich, Germany

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METHODS

Most methods used in these studies are described in Levi (1993a).

Internal genitalia of *Pronous* specimens were examined by removing the epigynum using minutennadeln (used otherwise for mounting small insects) mounted on a wooden stick. The epigynum was placed in Hoyer's medium between two coverslips so that either side could be examined. An outline drawing was made with a dissecting microscope, at the same magnification as the illustration of the epigynum. Details were added later. Finally, the epi-

gynum was removed from the mount and placed in a 2-by-4-mm glass vial stoppered with cotton and kept with the female specimen.

Palpi were spread out by pulling apart rather than by expanding, because pulling apart keeps all sclerites in similar positions and makes it easier to match and illustrate the labeled sclerites with those of the contracted palpus. This is of special importance in genera related to *Araneus* that have well-developed distal hematodocha.

The sizes of the eyes are expressed as diameters of the anterior median eyes; distances between eyes of the anterior row are expressed as diameters of the anterior median eyes (in profile), and distances between eyes of the posterior row are given as diameters of the posterior median eyes (in profile). The height of the clypeus, the distance between the anterior median eyes and the edge of the carapace, is expressed as diameter of the anterior median eyes (Levi, 1993a, fig. 28f). These measurements are approximate.

To examine for the presence of a tapetum, the eyes of *Pronous* specimens were first checked with reflected light. When no tapetum was found in the posterior median eyes, the eye region of the carapace (of a female *P. quintana*) was cut off, cleared with methyl benzoate, and examined more carefully.

Actinosoma Holmberg

Actinosoma Holmberg, 1883: 239. Type species *Actinosoma pentacanthum* (Walckenaer) designated by Holmberg and by monotypy. The gender of the name is neuter (Bonnet, 1955: 156).

Diagnosis. *Actinosoma* is readily separated from all other Neotropical araneid genera by the five large sclerotized, orange spines on the abdomen of both female and male (Figs. 4–6, 10), an autapomorphic character. The genitalia are very similar to those of *Alpaida*, but the terminal apophysis of the male palpus is a simple structure (A in Fig. 9); in *Alpaida* it is subdivided.



Map 1. Distribution of *Actinosoma pentacanthum*.

Actinosoma differs from *Micrathena*, with which it is commonly confused, by having the first pair of legs longer than the fourth, by lacking stridulating structures on the book-lungs (present in most *Micrathena*), and by lacking a square to rectangular abdomen of the male. The abdomen of male *Actinosoma* has spines (Fig. 10) just as in the female; male *Micrathena* lack them.

Description. Female. Abundant black pigment between median eyes (Fig. 7). Width of cephalic region behind eyes slightly more than half thoracic width. Epigynum with projecting, rounded shelf, its tip a rounded lobe (Figs. 1–3) as in *Alpaida*.

Male. Width of eye region behind eyes about half the width of the thoracic region (Fig. 11). Palpus with conductor in middle of tegulum (Fig. 8, C in Fig. 9); tegulum without sclerites on distal, ventral side (right, in left palpus at 3 hr in Fig. 8, T in Fig. 9). Paramedian apophysis (PM in Fig. 9) is a separate, lightly sclerotized, L-shaped sclerite attached by soft stalk to conductor. Median apophysis cup-shaped

(M in Fig. 9; Levi, 1988, fig. 10), as it often is in *Alpaida*. Embolus supported by paramedian apophysis; its tip on conductor (E in Fig. 9). Terminal apophysis a narrow lobe above embolus (A in Fig. 9).

Relationship. The lobe of the epigynum of the female resembles that of *Alpaida* (see Levi, 1988) and *Micrathena* (see Levi, 1985); it is a synapomorphy. The palpus has the conductor in the center of the tegulum (C in Fig. 9) as in *Alpaida* and *Micrathena*, and there is a paramedian apophysis (PM in Fig. 9) as in these two genera [it may be missing in some *Micrathena* (Levi, 1985)], another synapomorphy of various genera. Unlike *Ara-neus*, *Neoscona*, *Madrepeira*, *Tatepeira*, and others (Figs. 213, 224), the median apophysis lacks sharp spines or flagella-like extensions.

Natural History. *Actinosoma pentacanthum* lives on emergent aquatic vegetation above the water surface in the middle of ponds and puddles.

Distribution. Only one species is widespread in South America (Map 1).

Misplaced. *Actinosoma heteracantha*

Mello-Leitão, 1943, is *Wagneriana heteracantha* (Mello-Leitão) (Levi, 1991c).

Actinosoma riscoi Archer (1971: 158, figs. 3, 4, ♀) is *Rubrepeira rubronigra* (Mello-Leitão) (Levi, 1991a).

***Actinosoma pentacanthum* (Walckenaer)
Figures 1–12; Map 1**

Plectana pentacantha Walckenaer, 1841: 170. Locality of specimens not known but may have been from Cayenne (French Guiana); specimens lost.

Acrosoma stelligerum Thorell, 1860: 301; 1868: 26. Origin of specimen unknown and type specimens not in NRMS, lost. Specimens determined by Thorell from Corumbá, Mato Grosso [Mato Grosso do Sul], Brazil, in NRMS, examined. Similarity of description of *stelligerum* and *pentacantha* first noticed by Butler (1873). Name first synonymized by Holmberg (1883).

Acrosoma pentacanthum:—Butler, 1873: 428. Holmberg, 1883: 237.

Acrosoma pulcherrima Holmberg, 1876: 143 (p. 21 in a separate publication, not seen). Specimens from Puerto Obligada [Vuelta de Obligado, Prov. Buenos Aires, 33°35'S, 59°49'W (USDI, 1968)], Argentina, lost. First synonymized by Holmberg (1883).

Actinosoma pentacanthum:—Holmberg, 1883: 239. Roewer, 1942: 778. Bonnet, 1955: 156.

Cyrtarachne quinquespinosa Keyserling, 1892: 55, pl. 3, fig. 44, ♀, ♂. Five immature and five female syntypes from Espirito Santo, Brazil, in USNM, examined. Göldi, 1892: 227. First synonymized by Simon (1895).

Araneus pentacanthus:—Simon, 1895: 819, fig. 869, ♀. Badcock, 1932: 27.

Araneus pentacantha:—Zapfe, 1957: 29, fig. 3, ♀, ♂.

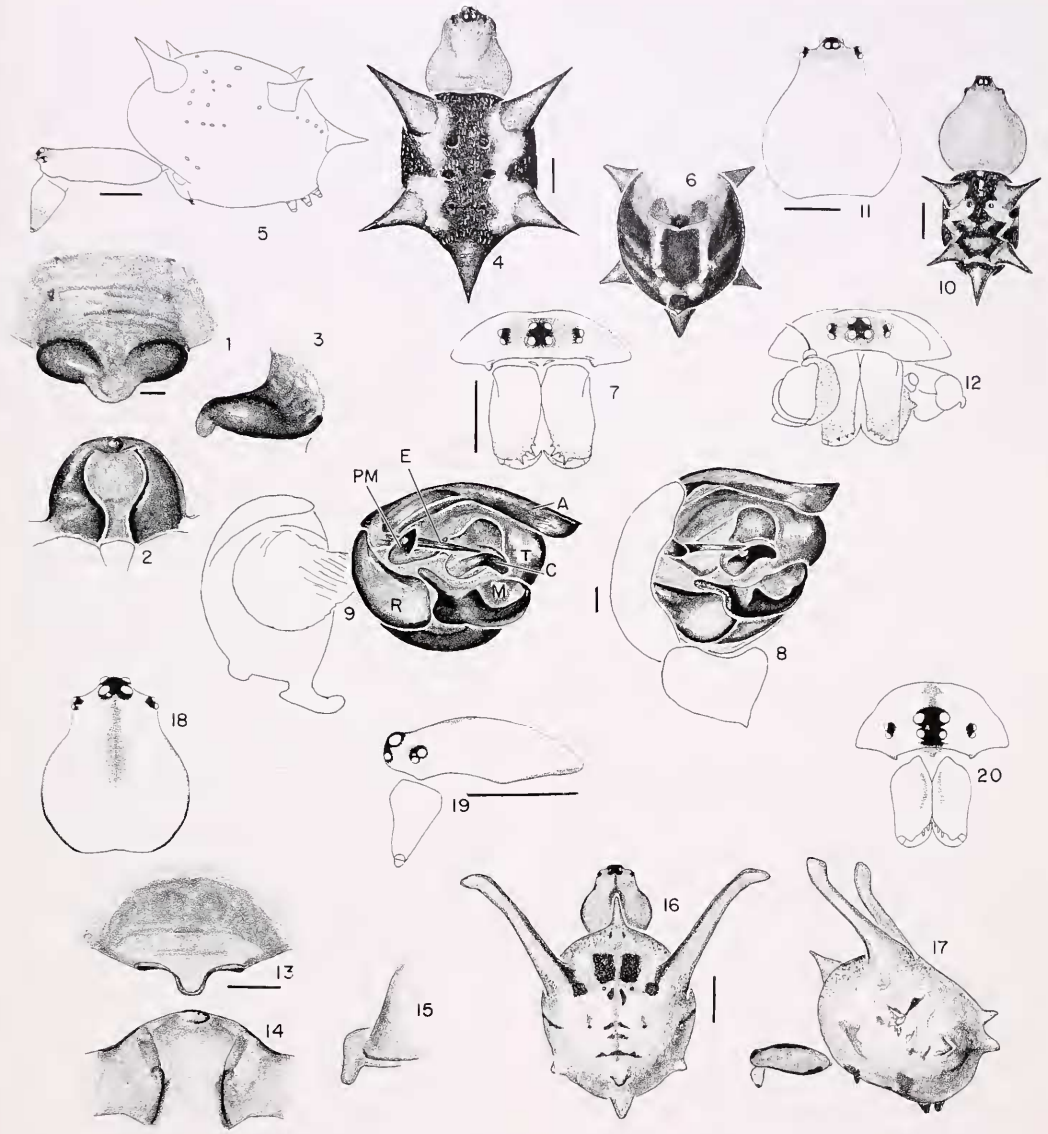
Note. *Acrosoma* Perty, 1833, with the type species *A. swainsoni*, is a subjective synonym of *Micrathena* (Levi, 1985). *Cyrtarachne* Thorell (1868: 10) was a name to replace *Cyrtogaster* Keyserling (1864: 80) [the name preoccupied by Walckenaer (1833) for a hymenopteran]. The genus has the type *Cyrtogaster grubei*, by monotypy, from Mauritius, Indian Ocean, for an araneid with the carapace high in thoracic region and abdomen triangular, wider than long, pointed behind, and having four dorsal tubercles.

According to Holmberg (1883: 227), the information of 1876 was published on page 143, 1876 (date from Holmberg); it is page 21 on a photocopy of the journal that was available.

The syntypes of *Cyrtarachne quinquespinosa* were unexpectedly found in unsorted collections of the USNM. The USNM specimens were recognized as Keyserling specimens because they were labeled “Espirito Santo, Cyrtarachne 5-spinosa Keys.,” on a label, 24 by 30 mm, having toothed perforations on all four sides and a blue frame, a short distance inside from the white teeth. This is a typical Keyserling label. A second plain old label in the vial read “Espirito Santo, Rio Minas”.

Description. Female from Puerto Napo, Ecuador. Carapace orange, eye region black. Chelicerae orange, distally black. Labium, endites black. Sternum, coxae orange; legs without rings, dusky black, femora darkest. Dorsum of abdomen with orange and black, the black including paired white patches (Fig. 4); venter black with a pair of white lines (Fig. 6). Eyes subequal. Anterior median eyes their diameter apart, 2 diameters from laterals. Posterior median eyes 0.8 diameter apart, 2.5 diameters from laterals. Ocular quadrangle slightly narrower behind than in front, slightly longer than wide. Height of clypeus equals 1.1 diameters of anterior median eye. Abdomen with five prominent spines (Figs. 4–6). Total length 8.0 mm. Carapace 3.2 mm long, 2.7 wide, 1.5 behind lateral eyes. First femur 3.4 mm, patella and tibia 3.9, metatarsus 2.7, tarsus 1.5. Second patella and tibia 3.3 mm, third 2.3. Fourth femur 3.4, patella and tibia 3.7, metatarsus 2.5, tarsus 1.1.

Male from Puerto Napa, Ecuador. Coloration as in female (Fig. 10). Posterior median eyes 0.8 diameter of anterior medians, laterals 0.8 diameter. Anterior median eyes 0.7 diameter apart, 1.4 diameters from laterals. Posterior median eyes 0.6 diameter apart, 2 diameters from laterals. Ocular quadrangle narrower behind, slightly longer than wide. Height of clypeus equals 1.2 diameters of anterior median eye. Endite with tooth facing a tubercle on the coxa and a tooth on the proximal end of the palpal femur. Palpal patella with one macroseta. First coxa with hook. Second tibia thicker than first but



Figures 1-12. *Actinosoma pentacanthum* (Walckenaer). 1-7, female. 1-3, epigynum. 1, ventral. 2, posterior. 3, lateral. 4, dorsal. 5, lateral. 6, abdomen ventral. 7, eye region and chelicerae. 8-12, male. 8, left palpus, mesal view. 9, palpus pulled apart. 10, dorsal. 11, carapace. 12, eye region, chelicerae and right palpus.

Figures 13-20. *Spinepeira schlingeri* n. sp., female. 13-15, epigynum. 13, ventral. 14, posterior. 15, lateral. 16, dorsal. 17, lateral. 18, carapace. 19, carapace and chelicera. 20, eye region and chelicerae.

Abbreviations. A, terminal apophysis. C, conductor. E, embolus. M, median apophysis. PM, paramedian apophysis. R, radix. T, tegulum.

Scale lines. 1.0 mm, genitalia 0.1 mm.

without macrosetae. Abdomen as in female (Fig. 10). Total length 6.7 mm. Carapace 3.1 mm long, 2.3 wide; 1.1 behind lateral eyes. First femur 3.4 mm, patella and tibia 3.8, metatarsus 2.4, tarsus 1.1. Second patella and tibia 3.1 mm, third 2.0. Fourth femur 3.3 mm, patella and tibia 3.4, metatarsus 2.1, tarsus 1.0.

Note. Males and females were collected together.

Variation. Total length of females 7.0 to 9.7 mm, males 6.0 to 7.0 mm. The bases of the five spines vary in width in different specimens. Specimens from the Napo River, Ecuador, were used for the illustrations, except for the dorsal view of the female (Fig. 4), which was made from a specimen from Mato Grosso, Brazil (NRMS). Recently collected specimens had bright orange, black, and white coloration.

Diagnosis. The abdomen with five sclerotized spines in both males and females (Figs. 4, 5, 10), and the orange, white, and black coloration, separates the species from all other araneids.

Natural History. Holmberg (1876) captured the spiders along the sides of a brook. Göldi (1892) found this red spider in earthen organ-pipe tubes of wasps, which were attached to walls and window frames in Santo Antônio de Pádua, Est. Rio de Janeiro, Brazil. The Colombian specimens were taken from a *Sceliphron* wasp nest. All others were from ponds or streams. Specimens from the Napo River, Ecuador, were collected by sweeping below water and water surface in middle of a swamp. A female from Manaus, Brazil, came from *Paspalum* grass, which forms vast floating meadows in Amazonian rivers. Badcock (1932: 27) recorded the species as "common everywhere on surface of swamps" in Paraguayan Chaco. Badcock's locality is described by Carter (1928: 97), the collector, as an island surrounded by swamps with daily maximum temperatures of 90° F (42° C), mean 85° F (30° C), with surface layer of water at 108° F (43° C). A specimen from Paraguay (MHNG) was collected in a swamp. Cor-

ronca (personal correspondence) reported webs in flooded grasslands, in tropical Bañado areas. When the web is disturbed, the spider dives or walks on the water surface. This species is probably just as common in rain forest ponds as in wet areas of dry regions, but collectors are more likely to be attracted to marshes and ponds in dry areas. Galiano reported in collecting data from Santa Fé Province, Argentina, that the spider makes a horizontal web on floating plants.

Distribution. Amazon area to Buenos Aires Province, Argentina (Map 1).

Specimens Examined. COLOMBIA *Amazonas*: 25 km N Leticia, 2♀ (MCZ). ECUADOR *Napo*: 10 km E Puerto Napo, S side Río Napo, 6♀, 6♂, 14 imm. (MCZ). PERU "northern PERU", Reaner [local. ?], 4♀ (AMNH). *Loreto*: Parinari Canyon, Río Samiria, 1♀, 1♂, imm. (AMNH). *Huánuco*: Monzón Valley, Tingo María, 1♀, 1♂ (CAS). BRAZIL *Amazonas*: Porto América [05°10'S on Rio Madeira or 07°39'S on Rio Purus, Vanzolini, personal communication], 1♀ (AMNH); Rio Autáz, Santa Amelia, 1♀ (NRMS); Rio Autáz, Cururuzinho, 1♂ (NRMS); Manaus, Bilhares, 2♂ (NRMS); Manaus, Flores, 1♀ (NRMS); Rio Negro, 1♀ (MZSP); Manaus, Igarapé, km 30, M-Caracará, 1♀ (INPA); Manaus, 1♀ (INPA). *Mato Grosso*: Poconé, km 11 Transpantaneira, imm. (MCZ). *Rio de Janeiro*: Santo Antônio de Pádua (Göldi, 1892). *São Paulo*: Reprisa, São José de Rio Preto, 1♀, 1♂ (MZSP). BOLIVIA *El Beni*: Yacuma, Éspirito, 1♀ (ZSM); Rosario, 2♀ (USNM); 1♀ (M. R. Lopez, USNM). *La Paz*: Reyes, 14°03'S, 68°01'W (Zapfe, 1957); upper lake on Chacaltaya, 1♀ (ZSM). PARAGUAY *San Pedro*: 2 km NW Lima, imm. (MHNG). *Presidente Hayes*: Transchaco, km 320, 2♀ (IRSNB); Makthlawaiya (Badcock, 1932). *Paraguari*: nr. Ybytymí, 11♀, 5♂ (MCZ). *Guairá*: As. Tacuara. *Central*: Esterus del San Lorenzo, 1♀, 1♂ (CAS); Asunción, 1♀ (MCZ); Villa del Maestro, San Lorenzo, 2♀, 1♂, 2 imm. (MHNG). *Caaguazú*: 20 km N Cnl. Oviedo, 1♀ (MHNG). ARGENTINA *Formosa*: Reserva Ecológica El Bagual, 5♀, 1♂ (FMLT, MCZ). *Chaco*: Selva del Río de Oro, 1♀, 1♂ (MEG). *Santa Fé*: Arroyo El Toba, 1♀, 1♂ (MEG); Tortagal, 5♀, 1♂ (FMLT). *Buenos Aires*: San Nicolás, Baradero, Pilar (Holmberg, 1883); Buenos Aires, 1♀ (MCZ); Delta de Parana, Arroyo Espera, 1♂ (MEG); Escobar, 1♂ (MACN); Campana, 2♀ (CAS); Tigre, 2♀ (BMNH).

Spinepeira new genus

Type species. *Spinepeira schlingeri*. The name is an arbitrary combination of letters attached to "epeira". The name of the genus is feminine.

Diagnosis. This genus, which is close to *Alpaida*, differs by having a pair of long projections on the abdomen, one anterior median tubercle, and two posterior median tubercles (Figs. 16, 17).

Relationship. The two posterior median tubercles represent a synapomorphy found in numerous genera including *Alpaida*, *Acanthepeira*, *Eriophora*, *Eustala*, and *Wagneriana*. With the exception of *Eustala*, these genera have males with a paramedian apophysis in the palpus. Additional characters placing the genus close to *Alpaida* are the black pigmentation between the median eyes (Figs. 18–20) and lack of setae on the carapace.

Spinepeira schlingeri new species Figures 13–20; Map 2

Holotype. Female holotype from Monzón Valley, Tingo María, Depto. Huánuco, Peru, 18 Dec. 1954 (E. I. Schlinger, E. S. Ross), in CAS. The species is named after the collector, entomologist E. I. Schlinger.

Description. Female holotype. Carapace yellow-white, with a longitudinal black line through the middle, area between median eyes black (Fig. 18). Chelicerae, labium, endites, sternum black. Legs yellow-white. Dorsum of abdomen with pairs of black and white patches (Figs. 16, 17); venter with genital area and spinnerets black and a large black patch between (Fig. 17). Posterior median eyes 1.5 diameters of anterior medians, anterior laterals 1 diameter, posterior laterals 1.5 diameters. Anterior median eyes 1.3 diameters apart, 2 diameters from laterals. Posterior median eyes their diameter apart, 1.5 diameters from laterals. Ocular quadrangle wider behind than in front. Height of clypeus equals 1 diameter of anterior median eye. Abdomen with a pair of long projections and one pair of lateral tubercles, an anterior median tubercle and two posterior median tubercles (Figs. 16, 17). Total length 5.5 mm. Carapace 1.7 mm long, 1.5 wide, 0.9 wide behind lateral eyes. First femur 2.2 mm, patella and tibia 2.7,



Map 2. Distribution of *Spinepeira schlingeri*.

metatarsus 2.0, tarsus 0.7. Second patella and tibia 2.0 mm, third 1.3, fourth 1.8.

No additional specimens have been found.

Hingstepeira new genus

Type species. *Epeira folisecens* Hingston, 1932. The name is an arbitrary combination of letters linking part of explorer Hingston's name to "epeira". The gender of the name *Hingstepeira* is feminine.

Diagnosis. *Hingstepeira* is separated from most other araneid genera by the shape of the abdomen: elongate, oval, usually widest at the posterior half (Fig. 24), with the spinnerets overhung by an anterior to the posterior tip of the abdomen (Figs. 25, 39, 44, 52). It differs from *Singa* by having less black coloration in the median eye region (Figs. 26–28) and by the genitalia, especially the palpus, which in *Hingstepeira* has a prominent paramedian apophysis (PM in Fig. 30). In the close spacing of the posterior median eyes (Fig. 38) and the shape and color of the abdomen, *Hingstepeira* is similar to *Metazygia*, but the paramedian apophysis of the male palpus (PM in Fig. 30) separates the genera. Unlike other male araneids, except the males of *Metazygia gregalis* (O. P.-Cambridge), *M. benella* Levi, and *M. yobena* Levi, the *Hingstepeira* male has the

distal end of the chelicerae modified and with a frontal tooth (Fig. 33). The *Metazygia* species have a widened fang faced by a wide anterior tooth (Levi, 1994, fig. 261).

There are other genera in which the females have an elongate abdomen extending beyond the spinnerets. *Hingstepeira* lacks the thick first pairs of legs of the southeast Asian *Perilla* Thorell, 1895, and *Hingstepeira*'s abdomen is wider. [*Perilla* has been placed by Brignoli (1983) in Nephilinae, which belongs in the family Tetragnathidae.] *Hingstepeira* differs from the Mediterranean and African *Nemoscolus* Simon, 1895, by having a paramedian apophysis in the palpus.

Hingstepeira differs from *Arachnura* Vinson, 1863, which has a similar web, by lacking the narrow tail; also, the male *Hingstepeira* lacks a sclerotized shield on the abdomen. *Hingstepeira* differs from the Indopacific *Milonia* Thorell, 1890, in lacking *Milonia*'s silver coloration. (*Milonia* may be a tetragnathid.)

Description. Cephalothorax glabrous, orange to orange-brown, median eye region black, without marks; cephalic area darker than thorax. Cephalic region in both sexes wide behind lateral eyes, more than half width of thoracic region (Figs. 26, 32). Median ocular quadrangle narrower behind than in front. Abdomen oval, longer than wide, widest in middle or posterior (Fig. 24). Abdomen coloration variable; all but one species (*H. isherston*) with transverse black rectangle between epigynum and spinnerets (Figs. 25, 44, 52). Epigyna variable, often with a smooth, bulbous projection (Figs. 21, 35).

The male of only one species (*H. folisecens*) is known. Male carapace slightly smaller than that of female (Figs. 32–34). Endite with tooth (Fig. 34) facing tubercle

on palpal femur. First coxa with hook on distal margin (Fig. 34). Palpal patella with one macroseta (Fig. 34). First and second legs with macrosetae.

Relationship. The presence of the paramedian apophysis of the male palpus (PM in Fig. 30), the absence of a distal hematodocha, the presence of the conductor (C) in the middle of the tegulum, and the free section of the tegulum on the upper right in the left palpus (T in Fig. 30) place the genus close to *Alpaida*.

Natural History. The *Hingstepeira* web resembles that of *Arachnura* by having a coiled up leaf as retreat in the upper vertical radius (Pl. 1).

Distribution. There are four species, all South American, found in the Amazon area and Guyanas.

Separating Species. The species differ in the markings on the abdomen. Males and females of the same species have similar markings.

KEY TO SPECIES OF *HINGSTEPEIRA*

The only male known is that of *H. folisecens* (Figs. 29–34).

1. Epigynum with median knob-shaped structure (Figs. 21–23, 35–37) 2
- Epigynum otherwise, without median knob-shaped structure 3
- 2(1). In ventral view of epigynum, round structure facing posteriorly (Fig. 21); abdomen with a dorsal, median, posterior black patch (Fig. 24) *folisecens*
- In posterior view of epigynum, round structure facing anteriorly (Fig. 35); abdominal pattern is a series of facing brackets (Fig. 38) *isherton*
- 3(1). In ventral view of epigynum, the median area, anterior of a transverse bar, is concave (Fig. 40); abdomen with black bands on sides (Fig. 43) *arnolisei*
- In ventral view epigynum convex (Figs. 45, 48); abdomen with two dorsal black bands (Fig. 51) *dimona*



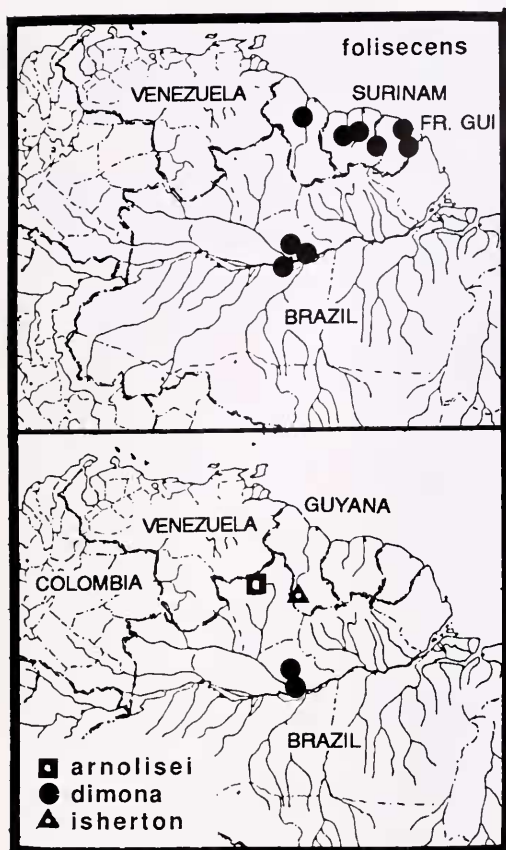
Map 3. Distribution of *Hingstepeira* species.*Hingstepeira folisecens* (Hingston)

Plate 1; Figures 21–34; Map 3

Epeira folisecens Hingston, 1932: 364, figs. 51, 52, webs. Female from Moraballi Creek, 2 mi [3.2 km] east of Essequibo River, 12 mi [19 km] south of Bartica, Guyana, lost. Not in BMNH, HECO.

Larinia bristowei Mello-Leitão, 1940: 180, figs. 6, 7, ♂. Male holotype from Moraballi Creek, Essequibo River, Guyana, in BMNH, examined. Brignoli, 1983: 272. NEW SYNONYMY.

Aranea folisecens:—Roewer, 1942: 842.

Araneus folisecens:—Bonnet, 1955: 504.

Note. Hingston's (1932, figs. 51, 52) illustration of the web of this species resembles the web recently photographed by H. Höfer (Pl. 1). Also, Hingston described the "abdomen . . . grey-brown darkening to

apex which is nearly black, . . . with spinnerets at about the centre, area behind spinnerets brown, a quadrate black patch in front of spinnerets. . . Total length 5 mm" (p. 364).

The type localities of *Epeira folisecens* and *Larinia bristowei* are the same.

Description. Female from Tarumã Mirim, Amazonas State, Brazil. Carapace orange, lightest posteriorly, area between eyes black. Chelicerae, labium, endites orange. Sternum, coxae light orange. Legs dusky orange. Dorsum of abdomen light gray, posterior end with a black patch (Fig. 24); venter with a dark, dusky trapezoidal patch between spinnerets and epigynum (Fig. 25). Posterior median eyes 0.8 diameter of anterior medians, laterals 0.5 diameter. Anterior median eyes 0.7 diameter apart, 1.3 diameters from laterals. Posterior median eyes 0.2 diameter apart, 2.5 diameters from laterals. Height of clypeus equals 0.4 diameter of anterior median eye. Abdomen elongate, widest behind middle (Fig. 24). Total length 5.7 mm. Carapace 2.1 mm long, 1.4 wide, 1.1 behind lateral eyes. First femur 1.3 mm, patella and tibia 1.8, metatarsus 0.7, tarsus 0.5. Second patella and tibia 1.6 mm, third 1.4, fourth 1.6.

Male holotype of *Larinia bristowei*. Carapace orange, black around eyes. Chelicerae, labium, endites, sternum, legs orange. Dorsum of abdomen whitish with three pairs of dusky patches and a black patch above spinnerets (Fig. 31); venter light gray. Posterior median eyes 0.6 diameter of anterior medians, laterals 0.5 diameter. Anterior median eyes 0.6 diameter apart, slightly more than their diameter from laterals. Posterior median eyes 0.6 diameter apart, 3 diameters from laterals. Height of clypeus slightly less than diameter of anterior median eye. Abdomen oval (Fig. 31). First and second legs armed with macrosetae; second thicker than first. Total length 3.7 mm. Carapace 1.9 mm long, 1.4 wide. First femur 1.4 mm, patella and tibia 1.9, metatarsus 1.2, tarsus 0.6. Second patella and tibia 1.6 mm, third 1.1, fourth 1.5.

Note. Males and females have been collected together and share similar markings on the abdomen, although males are darker than females.

Variation. Total length of females 4.7 to 7.4 mm, males 3.1 to 4.6. The sides of the abdomen in ventral view may be dark. The posterior patch on the abdomen and ventral markings may be almost absent, or gray to black. Illustrations were made from a female from near Manaus, Brazil (Figs. 21–28), from the male holotype of *Larinia bristowei* (Fig. 29), and from specimens from near Manaus, Brazil (Figs. 30–34).

Diagnosis. The elongate abdomen and the characteristic markings, a black patch on the posterior end (Figs. 24, 25, 31), separate this species from all other araneids.

Natural History. *Hingstepeira foliiscens* makes a vertical web with a curled leaf retreat attached to an upper radius (Hingston, 1932, figs. 51, 52; Pl. 1). Webs have been found in the interior and border of forests. They were found in igapó (periodically flooded forests) near Manaus and on the Manaus-Itacotiara in campina forest highway and in terra firma forest near Manaus. Adult males were common only during February and March.

Distribution. Guyanas and Brazilian Amazonian area (Map 3).

Specimens Examined. SURINAM Saramacca: Voltzberg-Raleighvallen Nature Reserve, 04°32'N, 56°32'W, 8 Feb. 1982, 1♀ (D. Smith Trail, MCZ). Merowijne: Anapaike Village, Lawa River, 8–29 Nov. 1963, 1♀ (E. Malkin, AMNH). Brokopondo: Browns Berg, 5°N, 55°27'W, 20 Feb. 1982, 1♀ (D. Smith Trail, MCZ). FRENCH GUIANA Cayenne: Montagnes Kaw, nr. Camp Calman, ca. 27 km SE Paura, 04°33'N, 52°09'W, 100–300 m, 25 Aug. 1988, 1♀; 1 Sept. 1988, 1♂ (S. Marshall, USNM). BRAZIL Amazonas: Tarumã Mirim, igapó, Manaus, 24 Apr. 1984, 1♀ (J. Adis, INPA); 25 Feb. 1987, 1♀ (H. Höfer, INPA); 5 Dec. 1987, 1♀ (H. Höfer, INPA); km 192, highway Manaus to Itacotiara, 18 Apr. 1987, 1♀ (H. Höfer, INPA); 80 km N Manaus, 9 Mar. 1989, 1♂ (H. Fowler, MCZ); Colosso Reserve, 80 km N Manaus, 18 Jan. 1989, 1♀, 1♂; Jan. 1989–June 1991, 63♀, 12♂; Reserva Cabo Frio, 80 km N Manaus, Oct. 1989–June 1991, 13♀, 3♂; 13 May 1992, 1♀; Reserva Dimona, 80 km N Manaus, 1989–1992, 3♀; Mar.–June 1991, 18♀; Reserva Km 41, 80 km N Manaus, Mar.–May 1991, 7♀; Reserva C. de Powell, 80 km N Manaus, 3♀; Reserva Florestal, 80 km N Manaus, 19 Feb. 1991, 3♀; Reserva Gavião, 21 Feb.–21 Oct. 1991, 3♀; (all H. Fowler, R. S. Vieira,

E. Venticinqe, MCZ); Reserva Porto Alegre, 80 km N Manaus, 1989–1992, 1♀; 27 May 1992, 1♀ (H. G. Fowler, MCZ).

Hingstepeira isherton new species Figures 35–39; Map 3

Holotype. Female holotype from Isherton, Guyana, 10 Nov. 1937 (W. G. Hassler), in AMNH. The specific name is a noun in apposition after the locality.

Description. Female holotype. Carapace orange, cephalic region darkest. Chelicerae orange-brown. Labium, endites dark brown. Sternum orange, sides dusky. Legs orange. Dorsum of abdomen with white pigment spots and five pairs of brackets (Fig. 38); venter black around spinnerets fading into surrounding area, except for clear border posteriorly (Fig. 39). Posterior median eyes 0.8 diameter of anterior medians, laterals 0.6 diameter. Anterior median eyes 0.8 their diameter apart, 1.8 diameters from laterals. Posterior median eyes 0.2 diameter apart, 4 diameters from laterals. Height of clypeus equals 0.2 diameter of anterior median eye. Abdomen elongate oval, widest posteriorly (Fig. 38). Total length 7.0 mm. Carapace 3.4 mm long, 2.1 wide, 1.5 behind lateral eyes. First femur 2.3 mm, patella and tibia 3.0, metatarsus 2.0, tarsus 0.8. Second patella and tibia 2.7 mm, third 1.6, fourth 2.3.

Note. This female has a dorsal abdominal pattern similar to *Metazygia*, and its eyes resemble those of *Metazygia* (Levi, 1994). The epigynum also resembles that of *Metazygia goeldii* Levi. The main *Hingstepeira* character is the elongate abdomen (Fig. 38). Only finding a male will ascertain the placement.

Diagnosis. The shape of the epigynum (Figs. 35–37) and the dorsal abdominal pattern (Fig. 38) separate this species from other *Hingstepeira*.

Hingstepeira arnolisei new species Figures 40–44; Map 3

Holotype. Female holotype from Ilha de Maracá, Rio Uraricoera, Roraima Stae, Brazil, 5 Dec. 1987

(A. A. Lise), in MCN no. 20062. The species is named after the collector.

Description. Female holotype. Carapace light orange-yellow. Chelicerae, labium, endites, sternum, legs yellowish white. Dorsum of abdomen with four longitudinal white bands, sides black anteriorly and posteriorly (Fig. 43); venter with a transverse black rectangle between epigynum and spinnerets, sides black (Fig. 44). Posterior median eyes 0.8 diameter of anterior medians, anterior laterals 1.2 diameters, posterior laterals 0.8 diameter. Posterior median eyes oval. Anterior median eyes their diameter apart, 2.3 diameters from laterals. Posterior median eyes their narrow diameter apart, 5 diameters from laterals. Height of clypeus equals diameter of anterior median eye. Abdomen elongate, 1.8 times as long as wide (Fig. 43). Total length 8.0 mm. Carapace 3.1 mm long, 2.3 wide, 1.8 behind lateral eyes. First femur 1.9 mm, patella and tibia 3.0, metatarsus 1.8, tarsus 0.9. Second patella and tibia 2.5 mm, third 1.7, fourth 2.5.

Diagnosis. *Hingstepeira arnolisei* differs from other *Hingstepeira* species by having a concave area on the anterior of the epigynum (Fig. 40) and by the lateral, black banding of the abdomen (Figs. 43, 44).

Hingstepeira dimona new species
Figures 45–52; Map 3

Holotype. Female holotype from Reserva Dimona, 80 km north of Manaus, Amazonas State, Brazil, in forest, 15 May 1991 (H. Fowler, R. S. Vieira, E. Venticinque), in MCN no. 25543. The specific name is a noun in apposition after the type locality.

Description. Female holotype. Carapace orange, darkest in midline. Chelicerae dark orange. Labium, endites, sternum orange. Legs orange with indistinct dark orange rings. Dorsum of abdomen with two black bands, midline and sides of bands white (Fig. 51); venter with a black transverse rectangle between epigynum and spinnerets, sides and posterior black (Fig. 52). Posterior median eyes 0.8 diameter of anterior medians, laterals 0.6 diameter. Anterior median eyes 0.6 diameter apart, 2 diameters from laterals. Posterior median eyes 0.3 diameter apart, 2.7 diameters from laterals. Height of clypeus equals 0.5 diameter of anterior median eye. Abdomen oval (Fig. 51). Total length 5.2 mm. Carapace 2.5 mm long, 1.8 wide, 1.3 behind lateral eyes. First femur 1.8 mm, patella and tibia 2.3, metatarsus 1.4, tarsus 0.7. Second patella and tibia 1.9 mm, third 1.1, fourth 1.8.

Variation. Total length of females 4.7 to 6.0 mm. The borders of the posterior lateral plates of the epigynum (Figs. 46, 49) are variable. Figures 45–47, 51, and 52 were made from the female holotype, and Figures 48–50 from the specimen from Reserva Ducke.

Diagnosis. The domed structure of the epigynum (Figs. 45–50) and the dorsal black bands of the abdomen (Fig. 51) separate this species from other *Hingstepeira*. The species may belong to *Metazygia* and be close to *M. laticeps* (Keyserling) (Levi, 1995, figs. 226–230).

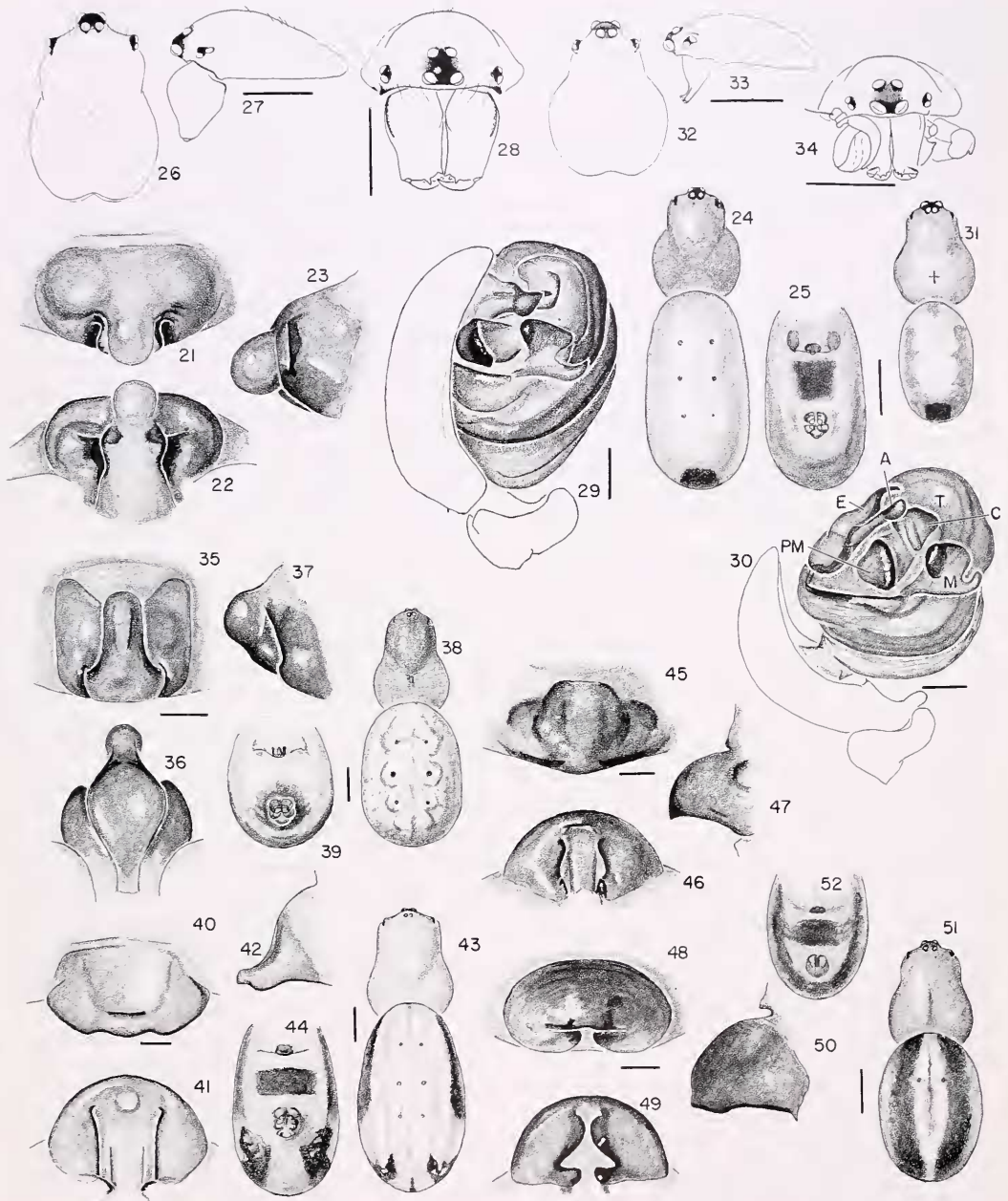
Natural History. All females were collected in forest.

Paratypes. BRAZIL *Amazonas*: Reserva Dimona, 80 km N Manaus, 26 Mar. 1991, 2♀; 17 May 1991,

Figures 21–34. *Hingstepeira folisecens* (Hingston). 21–28, female. 21–23, epigynum. 21, ventral. 22, posterior. 23, lateral. 24, dorsal. 25, abdomen ventral. 26, carapace. 27, carapace and chelicera. 28, eye region and chelicerae. 29–34, male. 29, left palpus. 30, palpus pulled apart. 31, dorsal. 32, carapace. 33, carapace and chelicera. 34, eye region, chelicerae, and right palpus.

Figures 35–39. *H. isherton* n. sp., female. 35–37, epigynum. 35, ventral. 36, posterior. 37, lateral. 38, dorsal. 39, abdomen, ventral.

Figures 40–44. *H. arnolisei* n. sp., female. 40–42, epigynum. 40, ventral. 41, posterior. 42, lateral. 43, dorsal. 44, abdomen, ventral.



Figures 45–52. *H. dimona* n. sp., female. 45–50, epigynum. 45, 48, ventral. 46, 49, posterior. 47, 50, lateral. 45–47, (holotype). 48–50, (paratype). 51, dorsal. 52, abdomen, ventral.

Abbreviations. A, terminal apophysis. C, conductor. E, embolus. M, median apophysis. PM, paramedian apophysis.

Scale lines. 1.0 mm, genitalia 0.1 mm.

1♀; 25 June 1991, 2♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ).

Specimens Examined. BRAZIL Amazonas: Reserva Ducke, Manaus, 26 July 1973, 1♀ (L. P. Albuquerque, MCN 20050); 27 Feb. 1974, 2♀ (L. P. Albuquerque, MCN 23561); Reserva Km 41, 80 km N Manaus, 21 May 1991, 1♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ); Cabo Frio, 80 km N Manaus, 13 Mar. 1989, 1♀; 27 May 1989, 1♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ).

Pronous Keyserling

Pronous Keyserling, 1881: 547. Type species *Pronous tuberculifer* Keyserling, 1881, by monotypy. The gender of the name is masculine (Bonnet, 1958: 3778).

Paphlagon O. P.-Cambridge, 1893: 117. Type species *Paphlagon beatus* O. P.-Cambridge, 1893, by monotypy. Species (erroneously) and genus synonymized with *P. tuberculifer* by O. P.-Cambridge (1898: 281).

Zigana Chamberlin and Ivie, 1936: 53. Type species *Zigana wixoides* Chamberlin and Ivie, 1936, by monotypy. NEW SYNONYMY.

Note. The synonymy of *Zigana* with *Pronous* was recognized by Chickering, judging from specimen labels, but was never published.

Diagnosis. The large posterior median eyes, which have lost their tapeta, are about twice the diameter of the anterior median eyes, face laterally, and are closer to the lateral eyes than to each other (Figs. 53–56, 58–62). This apomorphy separates *Pronous* from all other araneid genera including *Micrathena*. *Micrathena* and *Pronous* share two apomorphies: the fourth legs are longer than the first, and the abdomen of the male is almost rectangular (Figs. 61, 62).

Pronous differs from *Hypsosinga* by having the clypeus height equal to the diameter of the anterior median eye (in *Hypsosinga* the clypeus is higher) and by having the fourth legs longer than the first.

Pronous may be confused with linyphiid genera (e.g., *Dubiaranea* Mello-Leitão, 1943 = *Paranesticus* Mello-Leitão, 1944: 333 = *Hormembolus* Millidge, 1991), which have similar large posterior median eyes. The linyphiids, however, have a high

clypeus and thinner legs and may have a sclerotized stridulating ridge laterally on the chelicerae.

Description. Female. Species all with similar coloration and pattern: cephalothorax orange to orange-brown, sides of thoracic region sometimes darker. Chelicerae, labium, and endites orange. Sternum light orange-red. Coxae and legs dusky orange to brown, rarely black. Abdomen light orange with six black patches, two on middle tubercles and two pairs on posterior tubercles (Figs. 56, 57). Some specimens have scattered white pigment spots, especially on anterior median tubercle, and gray to black shading on posterior and sides (Fig. 55). Venter usually without pigment, sometimes with a median black streak. Living specimens are all bright orange-red with black marks.

Carapace punctate. Anterior median eyes always slightly larger than laterals and posterior medians about 2 diameters of anterior medians (Figs. 53–55). Median eye quadrangle wider behind than in front (Fig. 53). Height of clypeus about equal to diameter of anterior median eyes. Legs with femur almost as long as patella and tibia. Unlike *Micrathena*, *Pronous* lacks a stridulating area on the book-lung covers. Carapace width behind lateral eyes about half maximum diameter of carapace (Fig. 53). Posterior median eyes about 2 diameters of anterior medians. Anterior eyes their diameter apart, about 2 diameters from laterals. Posterior median eyes 1 to 1.5 diameters apart, 0.5 to 0.8 diameter from laterals. Abdomen with a small anterior median tubercle and three pairs of tubercles, one pair in middle, two pairs posterior (Pl. 2, Figs. 56, 57). Anterior median tubercle usually absent in females from South America (Fig. 57). Epigynum (Fig. 63) without scape, sclerotic areas transparent and difficult to delineate.

Male. Slightly smaller than female. Carapace punctate. Width of carapace behind lateral eyes narrower than half of width in thoracic region (Fig. 58). Posterior median eyes 1.5 to 2 diameters of anterior

median eyes. Anterior median eyes 0.6 to 1 diameter apart, 1 to almost 2 diameters from laterals. Posterior median eyes 1.1 to 1.5 their diameter apart, 0.5 to 1 diameter from laterals. Difference in length between first legs and longer fourth legs is always less in males than in females. Abdomen with a rectangular, lightly sclerotized, dorsal scutum, widest in anterior half, with only faint indications of tubercles (Figs. 60–62).

Male endite with tooth (Fig. 59), palpal femur with facing tubercle. Palpal patella with one macroseta (Fig. 59). First coxa with a small hook posteriorly on distal rim of margin, second femur with opposing small groove (Fig. 59). Second tibia with macrosetae on anterior face. Palpus with median apophysis within frame of tegulum in median view (M in Figs. 64, 65). Conductor positioned centrally on the tegulum (C in Figs. 64, 65). A lobe of tegulum overhangs conductor (at 12 hr in Figs. 64, 65). Embolus a curved structure, variable in thickness and shape in different species (E in Figs. 64, 65). Palpus without paramedian apophysis.

Variation. All species are remarkably similar in coloration, shape, and size (Pl. 2, Figs. 56, 57). Also, the variation of specimens of different species collected in the same area is similar: most South American females have smaller tubercles on the abdomen (Fig. 57) than those from Central America (Fig. 56), and the two specimens collected in Guyana (*P. nigripes* and *P. intus*) have black legs.

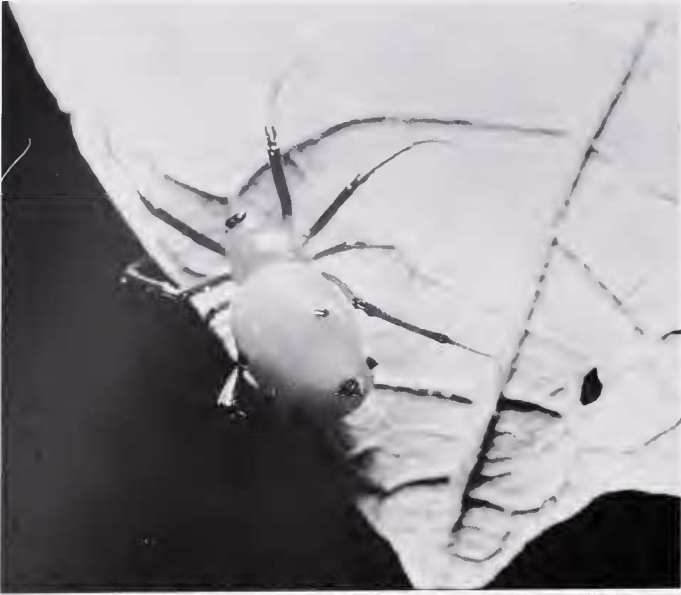
Relationship. The long fourth legs and nearly rectangular male abdomen of *Pronous* are characters shared with *Micrathena*; both are believed to be synapomorphies. However, *Micrathena* uses the long fourth legs to hold its abdomen upside down, horizontally, at a right angle to the web, making the sky and leaves the background for the bright dorsal coloration and the ground the background for the dull ventral view. *Pronous*, on the other hand, adopts a resting position more like that of other araneids (Eberhard, personal com-

munication). Thus, the homology of the long legs in the two genera is uncertain.

Natural History. The species makes small vertical webs, about 7 to 10 cm diameter, above leaf litter in forests (personal observations in Panama; Pl. 2). The web has few supporting threads and may catch walking insects and insects flying above ground level (Lubin, 1978). At the slightest disturbance, the spider falls from the web and disappears in leaf litter. Specimens are thus difficult to collect. About half of the available *Pronous* specimens were collected by A. M. Chickering, who laboriously sifted leaf litter.

Distribution. Fourteen species are American, most coming from Mexico and Central America (Map 4). The four species described by Simon (Roewer, 1942: 967) from Asia and Madagascar are probably all misplaced. The holotypes of only two of the four were found in the MNHN. *Pronous laevisternis* Simon, 1908, from Tonkin, the area around Hanoi, Vietnam, and *P. taprobanicus* Simon, 1895, from Ceylon (Sri Lanka), were examined and found to belong to *Hypsosinga*. The first is *H. pygmaea* (Sundevall, 1831), NEW SYNONYMY (see Levi, 1975). Another two, more recently described, *Pronous minutus* Saito, 1939 (in Yaginuma, 1986), and *Pronous tetraspinulus* Yin, Wang, Xie and Peng, 1990 (Platnick, 1993: 462) from China and Japan are probably also misplaced. The fourth legs are much shorter than the first in *P. minutus* (Song, personal communication); *P. minutus* may also be *Hypsosinga*. *Pronous chelifera* Hasselt (1882: 24), from Sumatra, is *Gea spinipes* C. L. Koch, 1843 (Levi, 1983).

Separating Species. Males are readily separated by the structure of their palpi, the shape of the embolus, the median apophysis, conductor, and tegular lobe. Females are difficult to separate: the epigyna of females of different species are similar. The borders of structures in the epigynum are transparent and difficult to delineate. The cleared epigynum showing ducts (cleared in Hoyer's medium) is help-



ful, but the dorsal view of the epigynum (vulva) is less so.

KEY TO FEMALE *PRONOUS*

The terms used in this key are illustrated in Figure 63.

1. Females from South America (Maps 4B, D, F, G) 2
- Females from Mexico or Central America (Maps 4A, B, C, E, F, G) 7
- 2(1). Epigynum with V-shaped dusky patch (Figs. 63, 131, 135); lateral and posterior overhang of epigynum wide (Figs. 131, 135); in posterior view long axis of opening longitudinal (Figs. 134, 138); South America (Map 4D) *tuberculifer*
- Epigynum otherwise (Figs. 98, 107, 117, 122, 127) 3
- 3(2). Epigynum with posterior median plate narrow ventrally, wider dorsally (at center of Fig. 120); lateral overhang with a pointed projection in ventral view (Fig. 117); Colombia (Map 4G) *valle*
- Sides of posterior median plate straight dorsally (Figs. 101, 106, 125, 130) 4
- 4(3). Anterior lip of epigynum visible in ventral view (Figs. 103, 107, 122, 127) 5
- Anterior lip not visible in ventral view (Fig. 98); Colombia (Map 4F) *wixoides*
- 5(4). Epigynum with anterior lip small (Fig. 127); dusky patches with a pair of round spots (Fig. 127); Guyana (Map 4G) *nigripes*
- Epigynum with anterior lip larger (Figs. 103, 107, 122); dusky patches otherwise 6
- 6(5). Anterior lip swollen in median (Figs. 103, 107); posterior lip curved anteriorly in median (Figs. 103, 107); Costa Rica to Ecuador, Venezuela, northern Brazil (Map 4B) *intus*
- Anterior lip not swollen in median (Fig. 122); Colombia (Map 4G) *pance*
- 7(1). Mexico (Maps 4A, C, E) 8
- Honduras to Panama (Maps 4A, B, C, E, F, G) 10
- 8(7). Epigynum with a median notch (Fig. 71) *quintana*
- Epigynum without notch (Figs. 66, 75) 9
- 9(8). Median area of epigynum with anterior margin of epigynum V-shaped (Fig. 66) *beatus*
- Median area of epigynum with margins parallel forming a small bordered longitudinal groove (Fig. 75) *felipe*
- 10(7). Epigynum in ventroposterior view with a transverse, oval median plate having a small median longitudinal ridge (Fig. 114); margin of epigynum rebordered (Fig. 112); Panama (Map 4G) *shanus*
- Epigynum otherwise (Figs. 79, 81, 83, 85, 88, 90) 11
- 11(10). In posterior view, epigynum median plate with wide median split (Fig. 96); Costa Rica (Map 4A) *golfito*
- Epigynum otherwise (Figs. 69, 82, 101) 12
- 12(11). Posterior lips of epigynum almost triangular in shape with a posterior median bulge (Fig. 79); Honduras (Map 4E) *lancetilla*
- Epigynum otherwise (Figs. 66, 83, 88, 98) 13
- 13(12). No distinct anterior lip visible in ventral view (Figs. 66, 98) 14
- Anterior lip visible in ventral view, sometimes only in median area (Figs. 83, 88) 15
- 14(13). Posterior median plate wider dorsally than ventrally and only barely notched ventrally (at 12 hr in Figs. 68, 69); Costa Rica (Map 4A) *beatus*
- Sides of posterior median plate about parallel and with a long median division (Fig. 101); in cleared view with a pair of median wide duct curves (Fig. 99); Panama (Map 4F) *wixoides*
- 15(13). Margin of epigynum in ventral view with a median longitudinal bordered groove (Fig. 83); Costa Rica (Map 4C) *peje*
- Epigynum otherwise (Figs. 88, 103, 107) 16
- 16(15). Ventroposterior view of epigynum with two curved openings, lateral plates constricting median plate; median plate with long groove (Fig. 90); Costa Rica (Map 4A) *colon*
- Epigynum otherwise, lateral plates only slightly constricting median plate (Figs. 105, 109); median plate with short ventral split (Figs. 106, 110); Costa Rica to Colombia (Map 4B) *intus*

KEY TO MALE PRONOUS

The males of *P. colon*, *P. lancetilla*, and *P. nigripes* are unknown.

- 1. Outer, upper edge of median apophysis (M in Figs. 64, 65) with a square notch, transverse spine of median apophysis thick (Fig. 97); Costa Rica (Map 4A) *golfito*
- Median apophysis without square corner notch (Figs. 64, 70, 74, 116) 2
- 2(1). Distal, outer edge of median apophysis with an outer spine and an elongate notch between it and edge (Figs. 70, 74, 116, at 3 hr in Fig. 70); Mexico to Panama (Map 4) 3
- Outer edge of median apophysis entire (Figs. 64, 78, 87, 121) 5
- 3(2). Embolus (E in Figs. 64, 65) a semicircular disk (Fig. 70); Mexico, Costa Rica (Map 4A) *beatus*
- Embolus filamentous (Figs. 74, 116) 4
- 4(3). Transverse spine of median apophysis close to its "upper" edge (Fig. 74); Mexico (Map 4C) *quintana*
- Transverse spine of median apophysis in middle of median apophysis (Fig. 116); Panama (Map 4G) *shanus*
- 5(2). Embolus a long fine thread, whose length (if stretched) is longer than diameter of palpus (Fig. 102); Panama to Colombia, Ecuador (Map 4F) *wixoides*
- Embolus otherwise (Figs. 87, 121, 139) 6
- 6(5). Embolus a semicircular disk (partly transparent) (Fig. 139); South America (Map 4D) *tuberculifer*
- Embolus more or less filamentous (Figs. 78, 111, 121, 126) 7
- 7(6). Spine of median apophysis annulate (Fig. 121); Colombia (Map 4G) *valle*
- Spine of median apophysis smooth (Figs. 87, 97, 126) 8
- 8(7). Median apophysis pointed distally "above" spine (at 3 hr in Fig. 78); Mexico (Map 4E) *feliipe*
- Median apophysis rounded "above" spine (Figs. 87, 111, 126) 9
- 9(8). Embolus thick, wider than opening of notch, the "upper" area enclosed by embolus (Fig. 87); Costa Rica (Map 4C) *peje*

- Embolus a finer thread (Figs. 111, 116) 10
- 10(9). Embolus a fine thread (Fig. 126); tegulum lobe truncate (at 12 hr in Fig. 126); Colombia (Map 4G) *pance*
- Embolus thick, tegulum lobe rounded (Fig. 111); Costa Rica to Ecuador (Map 4B) *intus*

Pronous beatus (O. P.-Cambridge)
Figures 66–70; Map 4A

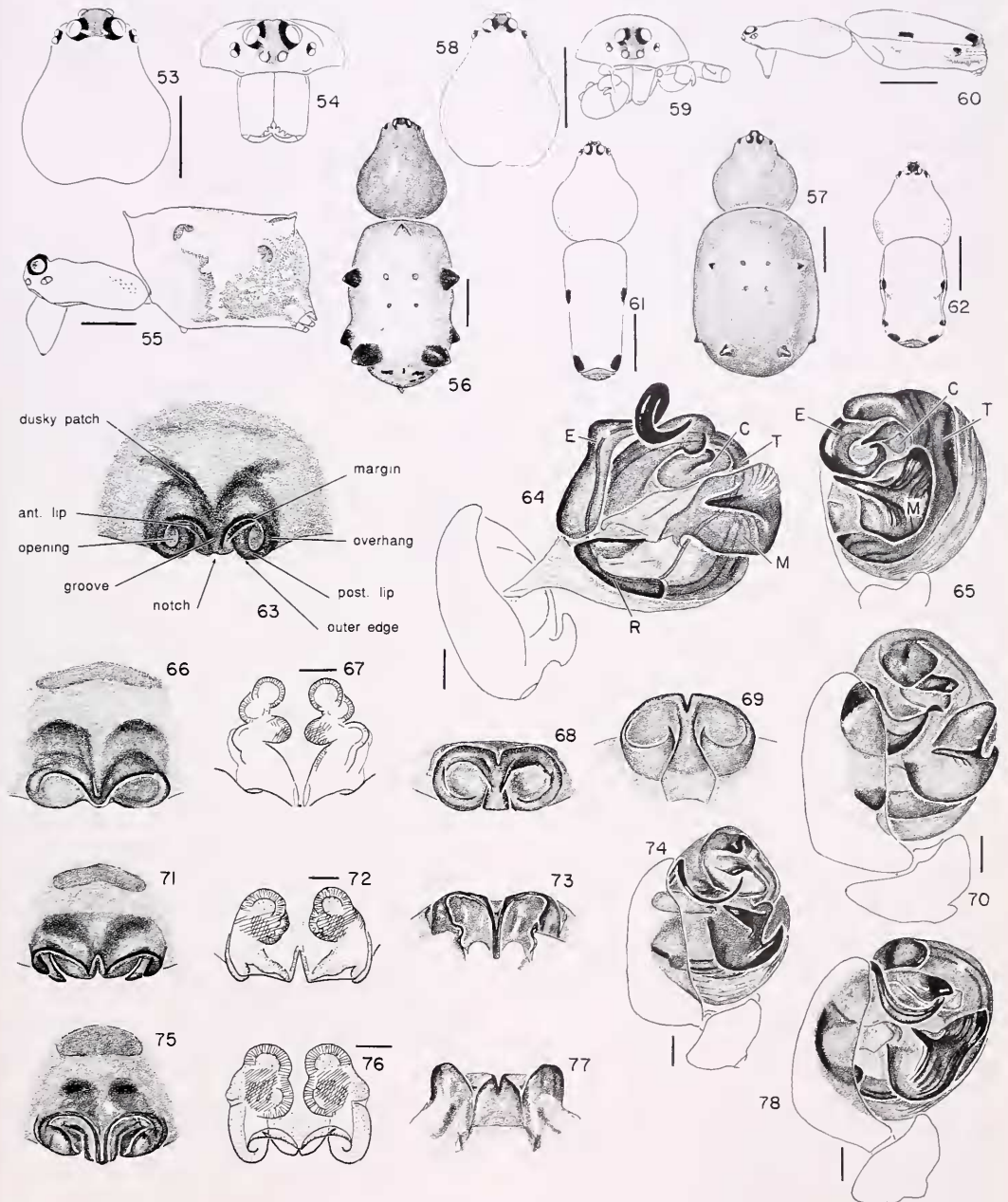
Paphlagon beatus O. P.-Cambridge, 1893: 117, pl. 14, fig. 10, ♀. Female from Teapa [Tabasco State], Mexico, in BMNH, lost. Erroneously synonymized with *P. tuberculifer* by O. P.-Cambridge (1898: 281).

Note. The holotype female, without male of *P. beatus*, could not be found in the BMNH. Cambridge later received more specimens and cited *P. beatus* as a synonym of *P. tuberculatus* (in error). These later females, together with males, were found in the BMNH to be *P. quintana*. There are two specimens in the HECO collection, one male and one female. The only label in the vial was made out for my loan, with my loan number, the *Paphlagon beatus* name, and locality, Teapa. However, the specimens also belonged to *P. quintana*. From O. P.-Cambridge's illustration, it is clear that the Hope Collection specimens cannot be the types. This was verified by a letter from I. Lansbury, stating that the holotype should be in the Natural History Museum in London. I suspect that when O. P.-Cambridge synonymized *Paphlagon beatus* (erroneously) the type label of *P. beatus* was changed, although it will always remain the type of this name, whether synonymized with another name or not.

Description. Female from Huehuetan.

Figures 53–65. Morphology of *Pronous*. 53–57, 63, female. 53, carapace. 54, eye region and chelicerae. 55, lateral. 56, 57, dorsal. 63, epigynum, diagrammatic. 58–62, 64, 65, male. 58, carapace. 59, eye region, chelicerae, right palpus, left first coxa and second trochanter, and proximal part of femur. 60, lateral. 61, 62, dorsal. 63, epigynum, diagrammatic. 64, 65, left male palpus. 64, palpus pulled apart. 65, ventral. 53, 54, 56, 58–61, 64, 65, *P. intus*. 55, *P. wixoides*. 57, 62, *P. tuberculifer*.

Figures 66–70. *Pronous beatus* (O. P.-Cambridge). 66–69, female epigynum. 66, ventral. 67, ventral, cleared. 68, ventroposterior. 69, posterior. 70, male left palpus, mesal.



Figures 71-74. *P. quintana* n. sp. 71-73, female epigynum. 71, ventral. 72, ventral, cleared. 73, posterior. 74, male palpus.

Figures 75-78. *P. felipe* n. sp. 75-77, female epigynum. 75, ventral. 76, ventral, cleared. 77, posterior. 78, male palpus.

Abbreviations. C, conductor. E, embolus. M, median apophysis. R, radix. T, tegulum.

Scale lines. 1.0 mm, genitalia 0.1 mm.

Total length 4.5 mm. Carapace 2.0 mm long, 1.7 wide, 1.1 behind lateral eyes. First femur 2.2 mm, patella and tibia 2.2, metatarsus 1.7, tarsus 0.9. Second patella and tibia 1.9 mm, third 1.5. Fourth femur 2.9 mm, patella and tibia 2.8, metatarsus 2.1, tarsus 0.7.

Male from Huehuetan. Abdomen elongate, intermediate between *P. intus* (Fig. 61) and *P. tuberculifer* (Fig. 62). Total length 4.3 mm. Carapace 1.9 mm long, 1.6 wide, 0.8 behind lateral eyes. First femur 2.1 mm, patella and tibia 2.0, metatarsus 1.8, tarsus 0.9. Second patella and tibia 1.7 mm, third 1.3. Fourth femur 2.7 mm, patella and tibia 2.4, metatarsus 2.2, tarsus 0.9.

Note. Males and females were collected together.

Variation. Total length of females 4.5 to 4.8 mm, males 4.3 to 4.7. The specimens illustrated came from near Huehuetán, Chiapas.

Diagnosis. The epigynum of the female differs from *P. quintana* (Figs. 71–73) in lacking a median notch in ventral view (Fig. 66). In posterior view the epigynum differs from that of *P. felipe* (Fig. 77) by having a median plate that is narrow ventrally and widest dorsally (Fig. 69). The male has a round semicircular embolus (Fig. 70), as does the South American *P. tuberculifer* (Fig. 139). The outer edge of the median apophysis has a notch separating off an outer spine (Fig. 70); the transverse spine has nearly parallel sides and, unlike *P. quintana* (Fig. 74), a large lobe above (Fig. 70).

Distribution. Mexico, perhaps to Costa Rica (Map 4A).

Specimens Examined. MEXICO *Nayarit*: San Blas, 4–5 Aug. 1947, 1♂ (B. Malkin, C., M. Goodnight, AMNH). *Jalisco*: Río Pitillal, Playa Grande, 5 km E Puerto Mallarta, 12 July 1989, 1♀; 8 July 1992, 3♀ (R. West, MCZ); Chamela, Sept. 1989, 1♀ (W. Eberhard, MCZ). *Oaxaca*: 3.2 km SE Niltepec, 16°32'N, 94°33'W, 16 Aug. 1966, 1♀ (J. W. Ivie, AMNH); 8 km E Tapanatepec, 230 m, 28 Aug. 1967, 1♀ (R. E. Leech, REL). *Chiapas*: Esquintla, 1♀ (Crawford, MCZ); 10 km N Arriaga, 305 m, 23 Aug. 1972, 1♀ (C. Mullinex, K. Lucas, CAS); Finca Santa Marta, nr. Huehuetán, 31 July–1 Aug. 1950, 5♀, 2♂ (C., M. Goodnight,

AMNH); 16 km SE Tierra y Libertad [?], 1,000 m, 23 Aug. 1972, 1♂ (C. Mullinex, K. Lucas, CAS). COSTA RICA *Cartago*: El Cedral, Navarro Orosi-Cartago, 29 Nov. 1979, 1♀, doubtful determination (C. E. Valerio, MZCR).

Pronous quintana new species Figures 71–74; Map 4C

Pronous tuberculatus:—O. P.-Cambridge, 1898: 281, pl. 36, fig. 13, ♂ (misidentification).

Holotype. Male holotype, male paratype, and two female paratypes from 31 km NE of Felipe Carrillo Puerto, on Highway 307 toward Tulum, ca. 19°48'N, 87°52'W, Quintana Roo, Mexico, 17 July 1983 (W. Maddison, R. S. Anderson), in MCZ. The specific name is a noun in apposition after the locality.

Note. Cambridge specimens (1898, but not 1893), both females and males, are all *P. quintana*.

Description. Female paratype. Coloration as in other species, legs dark orange, dusky marks on sides of carapace. Total length 5.4 mm. Carapace 2.1 mm long, 1.9 wide, 1.1 wide behind lateral eyes. First femur 2.0 mm, patella and tibia 1.9, metatarsus 1.7, tarsus 0.7. Second patella and tibia 1.8 mm, third 1.5. Fourth femur 2.8 mm, patella and tibia 2.7, metatarsus 2.1, tarsus 0.9.

Male holotype. Abdomen relatively short, intermediate between *P. intus* (Fig. 61) and *P. tuberculifer* (Fig. 62), with soft, bulging sides. Black patches small. Total length 4.3 mm. Carapace 1.9 mm long, 1.5 wide, 0.7 behind lateral eyes. First femur 1.2 mm, patella and tibia 1.9, metatarsus 1.3, tarsus 0.7. Second patella and tibia 1.5 mm, third 1.1. Fourth femur 2.1 mm, patella and tibia 2.0, metatarsus 1.6, tarsus 0.6.

Note. Males and females were matched on the basis of two collections that included both sexes.

Variation. Total length of females 3.6 to 5.4 mm, males 3.6 to 4.3. The illustration of the male palpus (Fig. 74) was made from the holotype; the female (Figs. 71–73) was drawn from a specimen from near La Palma, Veracruz.

Diagnosis. The female differs from other Mexican species by having a deep



Map 4. Distribution of *Pronous* species.

median notch on the posterior margin of the epigynum (Fig. 71). The male differs by having a short, thread-like embolus and by the median apophysis having a lateral notch, separating off an outer spine (Fig. 74).

Natural History. The male holotype was found hanging by a thread from vegetation. The female was found close to the ground in forest, along the edge of a road in a small orb web with its hub open.

Distribution. Southern Mexico (Map 4C).

Specimens Examined. MEXICO *Veracruz*: Estación de Biología Tropical "Los Tuxtlas", nr. La Palma, 15 km N Catemaco, ca. 18°36'N, 95°07'W, 1, 2 Aug. 1983, 1♀, 1♂ (W. Maddison, AMNH ex MCZ); Aug. 1986, 2♀ (W. Eberhard 3363, 3366, MCZ). *Chiapas*: Pichucalco, 17 July 1947, 1♀ (C. M. Goodnight, AMNH); Palenque, July 1981, 1♀ (C. Gold, CAS). *Tabasco*: Teapa, 2♀, 2♂ (BMNH, HECO).

Pronous felipe new species Figures 75–78; Map 4E

Holotype. Male holotype from 31 km NE of Felipe Carrillo Puerto on Highway 307 to Tulum, 19°48'N, 87°52'W, Quintana Roo, Mexico, 17 July 1983 (W. Maddison, R. S. Anderson), in MCZ. The specific name is a noun in apposition after the locality.

Description. Female from Coba Ruins, Quintana Roo. Total length 4.9 mm. Carapace 2.2 mm long, 1.9 wide, behind lateral eyes 0.9 wide. First femur 2.1 mm, patella and tibia 2.1, metatarsus 1.6, tarsus 0.7. Second patella and tibia 2.0 mm, third 1.6. Fourth femur 2.9 mm, patella and tibia 2.6, metatarsus 2.3, tarsus 0.9.

Male holotype. Coloration light, abdomen intermediate in length between *P. intus* (Fig. 61) and *P. tuberculifer* (Fig. 62). Posterior dorsal black patches small. Posterior dorsal tubercles distinct. Total length 4.3 mm. Carapace 1.8 mm long, 1.5 wide, 0.7 wide behind lateral eyes. First femur 1.7 mm, patella and tibia 1.7, metatarsus 1.3, tarsus 0.7. Second patella and tibia 1.4 mm, third 1.1. Fourth femur 2.1 mm, patella and tibia 2.0, metatarsus 1.7, tarsus 0.7.

Note. Males and females were matched

by elimination, both being the third Mexican species after males and females of the other two species were associated.

Variation. Total length of females 4.9 mm, males 3.8 to 4.3. The illustrations were made from specimens from the Coba Ruins.

Diagnosis. The female differs from *P. beatus* (Figs. 66–69) and *P. quintana* (Figs. 71–73) by having a median longitudinal bordered groove in ventral view of the epigynum (Fig. 75). In the male, the palpus has a short embolus enclosing a shallow notch, and the median apophysis has a distal, "upper" point and no outer spine (Fig. 78).

Distribution. Eastern Mexico (Map 4E).

Specimens Examined. MEXICO *San Luis Potosí*: Tamazunchale, 6, 7 July 1941, 1♀ (L. I. Davis, AMNH); 19 April 1963, 1♀ (W. J. Gertsch, W. Ivie, AMNH); 26 June 1947, 1♀ (B. Malkin, AMNH). *Veracruz*: Cordoba, 20–27 July 1976, 1♀ (C. H., H. Seevers, AMNH); Tecolutla, 13 Oct. 1947, 1♂ (H. M. Wagner, AMNH). *Quintana Roo*: Coba Ruins, ca. 20°30'N, 87°42'W, 18 July 1983, 1♀ (W. Maddison, MCZ).

Pronous lancetilla new species Figures 79–82; Map 4E

Holotype. Female holotype from Lancetilla, Depto. Atlantida, Honduras, July 1929 (A. M. Chickering), in MCZ. The specific name is a noun in apposition after the locality.

Description. Female holotype. Total length 4.4 mm. Carapace 2.0 mm long, 1.6 wide, 0.9 behind lateral eyes. First femur 1.9 mm, patella and tibia 1.9, metatarsus 1.3, tarsus 0.7. Second patella and tibia 1.7 mm, third 1.2. Fourth femur 2.5 mm, patella and tibia 2.1, metatarsus 1.8, tarsus 0.8.

Diagnosis. *Pronous lancetilla* differs from *P. golfito* (Figs. 93–96) and other *Pronous* by having in ventral view of the epigynum a semicircular anterior margin, no anterior lips visible, and a transverse posterior lip forming a triangle on each side (Fig. 79). In posterior view, the median plate lacks the deep split (Fig. 82) present in *P. golfito* (Fig. 96). The internal

genitalia are simple (Fig. 80) as in *P. golfito* (Fig. 94).

Pronous peje new species
Figures 83–87; Map 4C

Holotype. Male holotype from La Selva, near Puerto Viejo, Heredia Prov., Costa Rica, 1–3 Dec. 1981 (J. Coddington), in MCZ. The specific name is a noun in apposition after the name of a stream near the type locality.

Description. Female paratype. Coloration as in other species but legs brown. Total length 4.3 mm. Carapace 1.9 mm long, 1.5 wide, 0.9 behind lateral eyes. First femur 1.9 mm, patella and tibia 1.9, metatarsus 1.3, tarsus 0.7. Second patella and tibia 1.6 mm, third 1.3. Fourth femur 2.4 mm, patella and tibia 2.1, metatarsus 1.8, tarsus 0.7.

Male holotype. Coloration as in other species but legs black. Abdomen elongate as in *P. intus* (Fig. 61). Total length 3.2 mm. Carapace 1.5 mm long, 1.1 wide, 0.6 behind lateral eyes. First femur 1.4 mm, patella and tibia 1.3, metatarsus 1.0, tarsus 0.6. Second patella and tibia 1.1 mm, third 0.8. Fourth femur 1.6 mm, patella and tibia 1.4, metatarsus 1.2, tarsus 0.6.

Note. Males and females were collected at the same locality.

Variation. Total length of females 4.1 to 4.4 mm. The illustrations (Figs. 83–87) were made from the holotype and paratype.

Diagnosis. *Pronous peje* differs from other species found in Costa Rica by the large circular margins of the epigynum and the presence of a bordered median longitudinal groove with parallel sides (Fig. 83). The embolus of the male encloses a small space with a diameter smaller than the diameter of the embolus at its widest (Fig. 87).

Natural History. A female from Limón Province was collected in a wet forest. Another from La Selva was collected with six unwrapped eggs.

Specimens Examined. COSTA RICA Heredia: La Selva, nr. Puerto Viejo, Feb. 1986, 2♀ paratypes (W.

Eberhard, MCZ). Limón: Cerro Tortuguero, Tortuguero, 110 m, 6 Jan. 1986, 1♀ (J. Coddington, USNM). PANAMA Chiriquí: La Fortuna, 5 Apr. 1984, 2♀ (W. Eberhard, MCZ).

Pronous colon new species
Figures 88–92; Map 4A

Holotype. Female holotype from near Villa Colón, San José Prov., Costa Rica, Nov. 1990 (W. Eberhard), in MCZ. The specific name is a noun in apposition after the locality.

Description. Female holotype. Total length 4.8 mm. Carapace 2.1 mm long, 1.7 wide, 1.1 wide behind lateral eyes. First femur 2.3 mm, patella and tibia 2.3, metatarsus 1.8, tarsus 0.9. Second patella and tibia 2.1 mm, third 1.6. Fourth femur 2.7 mm, patella and tibia 2.7, metatarsus 2.1, tarsus 1.0.

Diagnosis. *Pronous colon* differs from *P. golfito* (Fig. 93) and *P. peje* (Fig. 83) by the wide overhangs and almost circular openings on each side of the anterior lip as seen in the ventral view of the epigynum (Fig. 88). In posterior view, the epigynum of this species differs from others by having the median plate constricted by a shallow lobe of the lateral plates (Figs. 90, 91).

Pronous golfito new species
Figures 93–97; Map 4A

Holotype. Male from 3 km northeast of Golfito, 100 m, collected on and under logs, Puntarenas Prov., Costa Rica, 22, 23 May 1987 (D. Ubick), in CAS. The specific name is a noun in apposition after the locality.

Description. Female paratype. Total length 5.0 mm. Carapace 2.1 mm long, 1.7 wide, 0.8 behind lateral eyes. First femur 2.1 mm, patella and tibia 2.1, metatarsus 1.5, tarsus 0.7. Second patella and tibia 1.8 mm, third 1.4. Fourth femur 2.7 mm, patella and tibia 2.5, metatarsus 2.0, tarsus 0.8.

Male holotype. Abdomen elongate as in *P. intus* (Fig. 61). Total length 3.8 mm. Carapace 1.7 mm long, 1.3 wide, 0.6 behind lateral eyes. First femur 1.9 mm, patella and tibia 1.8, metatarsus 1.3, tarsus

0.7. Second patella and tibia 1.4 mm, third 1.1. Fourth femur 2.0 mm, patella and tibia 1.9, metatarsus 1.6, tarsus 0.7.

Note. Males and females were collected in the same area.

Variation. Total length of females 4.8 to 5.0 mm. The illustrations (Figs. 93–97) were made from the holotype and paratype.

Diagnosis. The female differs from *P. wixoides* by having only one pair of dark patches between seminal receptacles and anterior margin of the epigynum (Fig. 93) and by having the ventroposterior openings narrowly oval (Fig. 95). In posterior view it differs by the wide median notch (Fig. 96). The male differs from all others by the small nick on the “upper right” corner of the median apophysis of the left palpus (Fig. 97).

Natural History. Specimens were collected in forest vegetation.

Paratypes. COSTA RICA *Puntarenas*: Golfito, 24 July 1981, 29 paratypes (G. B. Edwards, FSCA); 24 July 1981, 1♀ (B. K. Dozier, FSCA).

Specimens Examined. COSTA RICA *Puntarenas*: Osa Peninsula, 4 km SW Rincon, 8–12 Mar. 1967, 1♀ (Organiz. for Tropical Studies, MCZ).

Pronous wixoides (Chamberlin and Ivie)
new combination
Figures 55, 98–102; Map 4F

Pronous beatus:—Banks, 1929: 96 (misidentification).

Zigana wixoides Chamberlin and Ivie, 1936: 53, pl. 16, figs. 137, 138, ♀. A female lectotype, here designated, and four female and one immature male

paralectotypes (all type specimens in poor condition), from Barro Colorado Island [Lago Gatún, Panamá Prov.], Panama, in AMNH, examined. Roewer, 1942: 883. Bonnet, 1959: 4962.

Description. Female from Barro Colorado Island, Panama. Total length 3.7 mm. Carapace 1.6 mm long, 1.4 wide, 0.9 behind lateral eyes. First femur 1.7 mm, patella and tibia 1.8, metatarsus 1.3, tarsus 0.6. Second patella and tibia 1.5 mm, third 1.1. Fourth femur 2.1 mm, patella and tibia 2.0, metatarsus 1.7, tarsus 0.7.

Male from Barro Colorado Island, Panama. Abdomen relatively short (Fig. 62). Total length 3.6 mm. Carapace 1.6 mm long, 1.3 wide, eyes 0.6 behind lateral eyes. First femur 1.7 mm, patella and tibia 1.6, metatarsus 1.4, tarsus 0.7. Second patella and tibia 1.3 mm, third 1.0. Fourth femur 1.8 mm, patella and tibia 1.8, metatarsus 1.5, tarsus 0.6.

Note. The sexes were matched on the basis of the connecting ducts in the epigynum of the female (Fig. 99), which correspond to the long embolus of the male. These ducts are longer in *P. wixoides* than in *P. intus* and *P. shanus*. The distribution of male specimens from Panama to Ecuador matches that of the females (Map 4F).

Variation. One female individual of doubtful determination from Serra Nueva Granada, northern Colombia, has the abdomen almost completely black. Total length of females 3.6 to 5.0 mm, males 3.4 to 4.1. The illustrations (Figs. 98–102) were

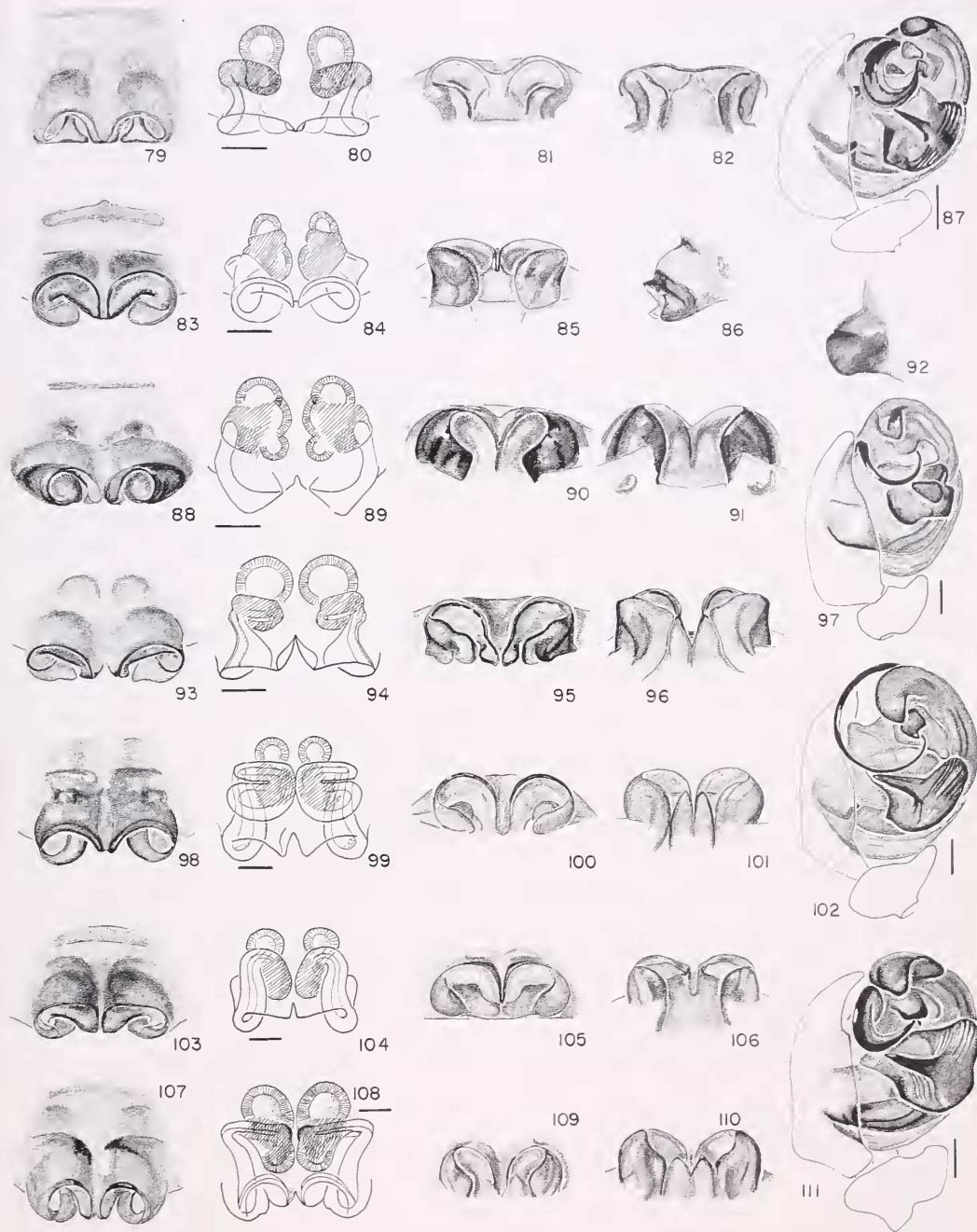
Figures 79–82. *Pronous lancetilla* n. sp., female epigynum. 79, ventral. 80, ventral, cleared. 81, ventroposterior. 82, posterior.

Figures 83–87. *P. peje* n. sp. 83–86, female epigynum. 83, ventral. 84, ventral, cleared. 85, posterior. 86, lateral. 87, male left palpus.

Figures 88–92. *P. colon* n. sp. 88–91, female epigynum. 88, ventral. 89, ventral, cleared. 90, ventroposterior. 91, posterior. 92, lateral.

Figures 93–97. *P. golfito* n. sp. 93–96, female epigynum. 93, ventral. 94, ventral, cleared. 95, ventroposterior. 96, posterior. 97, male palpus.

Figures 98–102. *P. wixoides* (Chamberlin and Ivie). 98–101, female epigynum. 98, ventral. 99, ventral, cleared. 100, ventroposterior. 101, posterior. 102, male palpus.



Figures 103-111. *P. intus* n. sp. 103-110, female epigynum. 103, 107, ventral. 104, 108, ventral, cleared. 105, 109, ventro-posterior. 106, 110, posterior. 111, male palpus. 103-106, 111, (Panama). 107-110, (Ecuador).

Scale lines. 0.1 mm.

made from specimens from Barro Colorado Island, Panama.

Diagnosis. This species is slightly smaller than *P. intus* and *P. shanus*. The female *Pronous wixoides* differs from related Central American species by having four (rather than two) dark patches on the anterior of the epigynum. The anterior pair of patches are in the shape of a transverse line (Fig. 98). The internal genitalia differ by having the duct loops facing each other in the median (Fig. 99). The female is difficult to separate from *P. intus*, which has an anterior lip showing in the median (Figs. 103, 107); *P. wixoides* does not (Fig. 98). The epigynum may have to be cleared for diagnosis. In contrast, the male differs from all other species by having a much longer filamentous embolus (Fig. 102).

Natural History. Specimens were collected in second growth forest near Buenaventura, Colombia.

Distribution. Panama, Colombia to southern Ecuador (Map 4F).

Specimens Examined. PANAMA Coclé: El Valle, Jan. 1936, 2♀ (J. A. Griswold, MCZ); July 1936, 1♂ (A. M. Chickering, MCZ); Oct. 1954, 1♀ (W. E. Lundy, AMNH). Colón: Fort Davis, 14 Aug. 1936, 1♀ (A. M. Chickering, MCZ); Porto Bello [Portobelo], 12 Aug. 1936, 1♀ (A. M. Chickering, MCZ). PANAMÁ: Barro Colorado Island, very common. COLOMBIA Magdalena: Serra Nueva Granada, S. N. de Santa Marta, 1,311 m, 24 May 1975, 1♀ (doubtful determ., J. A. Kochalka, JAK). Meta: ca. 15 km SW Puerto Lopez, Hacienda Mozambique, 200 m, 1♀ (W. Eberhard 1748, MCZ). Valle: Hydroelectric Dam on Río Anchicayá, 400 m, 1978, 1♂ (W. Eberhard, MCZ); no date, 1♀ (W. Eberhard, 851, MCZ); 1975, 1♀ (W. Eberhard, MCZ); 28 km E Buenaventura, 20 Jan. 1970, 1♀ (W. Eberhard 247, MCZ). Nariño: nr. Barbacoas, 20 m, 20 Mar. 1974, 1♀ (W. Eberhard 750, MCZ). ECUADOR "Peru, Palmar" [Palmar, Ecuador, see Palmares, 03°41'S, 80°00'W, El Oro Prov., 93 m (Stephens and Traylor, 1983)], 1♂ (K. Jelski, J. Sztolcman, PAN).

Pronous intus new species

Figures 53, 54, 56, 58–61, 64, 65, 103–111; Map 4B

Holotype. Male holotype and three female paratypes from Barro Colorado Island, Lago Gatún, Prov. Panamá, Panama, June 1950 (A. M. Chickering), in MCZ. The specific name is an arbitrary combination of letters.

Description. Female paratype. Total length 4.7 mm. Carapace 1.9 mm long, 1.6 wide, 1.1 behind lateral eyes. First femur 1.9 mm, patella and tibia 2.1, metatarsus 1.5, tarsus 0.7. Second patella and tibia 1.8 mm, third 1.3. Fourth femur 2.5 mm, patella and tibia 2.5, metatarsus 1.8, tarsus 0.7.

Male holotype. Abdomen elongate (Fig. 61). Total length 4.0 mm. Carapace 1.9 mm long, 1.5 wide, 0.7 behind lateral eyes. First femur 1.8 mm, patella and tibia 1.9, metatarsus 1.4, tarsus 0.7. Second patella and tibia 1.4 mm, third 1.2. Fourth femur 2.0, patella and tibia 1.9, metatarsus 1.7, tarsus 0.7.

Note. Males and females were matched on the basis of their distributions: both have been found from Costa Rica to northern South America. Also, clearing the epigynum of *P. intus* reveals a shorter duct than in *P. wixoides*, corresponding to a shorter embolus in the male palpus.

Variation. The abdomen of a male from Trinidad is shorter than that of other specimens. Total length of females 4.6 to 5.6 mm, males 3.5 to 4.7. Figures 53, 54, 56, 58–61, 103–106, and 111 were made from specimens from Barro Colorado Island, Panama, and Figures 107–110 from Ecuadorean specimens.

Diagnosis. In ventral view the openings of the epigynum have a wider anterior sclerotized lip at the median (Figs. 103, 107) than has *P. wixoides* (Fig. 98), and when cleared, the connecting ducts appear shorter (Figs. 104, 108) than those of *P. wixoides* (Fig. 99). The male palpus has a median apophysis (Fig. 111) as in *P. wixoides* but, unlike *P. wixoides* (Fig. 102), has a shorter, thicker embolus, lightly colored on the inside (Fig. 111).

Natural History. Specimens have been found in premontane forest and by sweeping meadows in Curumani, Colombia. A male was collected in a pitfall trap near Fortuna, Panama. A male from Luepa, Venezuela, came from a Malaise trap in cloud forest.

Distribution. Costa Rica to Venezuela

and Ecuador, northern Amazonas State, Brazil (Map 4B).

Paratypes. PANAMA *Panamá*: Barro Colorado Island, 16–20 July 1924, 1♀ (N. Banks); July 1934, 6♀; Jan. 1936, 4♀; June 1936, 1♀; July 1936, 1♂ (USNM ex MCZ); June 1939, 1♀, 1♂; July 1939, 1♂; Aug. 1939, 5♀; Sept. 1939, 2♀, 2♂; July 1950, 17♀, 2♂; Aug. 1950, 3♀; July 1954, 9♀, 2♂; Aug. 1954, 1♂; Jan. 1958, 8♀, 5♂; Feb. 1958, 16♂, 36♀ (MCZ, 1♂ in AMNH ex MCZ) (all A. M. Chickering, MCZ); 2♀ (K. W. Cooper, AMNH); Nov.–Dec. 1939, 1♀ (G. C. Wood, AMNH).

Specimens Examined. COSTA RICA *Limón*: Bataan [Batán], 16 June 1951, 1♀ (O. L. Cartwright, USNM). *Puntarenas*: Golfito, 16 July 1981, 1♂ (B. K. Dozier, FSCA); Osa Peninsula, Sirena, 10 m, Feb. 1984, 1♂ (W. Eberhard, MCZ). PANAMA *Bocas del Toro*: Fortuna, Chiriquí Grande Road, 8°47'N, 82°11'W, 16–18 July 1987, 1♂ (D. Olson, MCZ). *Chiriquí*: David, 26 Nov. 1975, 1♀ (D. Quintero, MCZ). *Coclé*: Valle, July 1936, 1♂ (A. M. Chickering, MCZ). *Panamá*: Summit, Sept. 1946, 1♀ (N. L. H. Krauss, AMNH); Gamboa, Jan. 1958, 1♀, 1♂ (A. M. Chickering, MCZ); Forest Reserve, 28 July 1954, 1♂ (A. M. Chickering, MCZ). *Darién*: Villa Darién, 12–18 Feb. 1984, 1♂ (M. N. García, MIUP). WEST INDIES *Trinidad*: nr. Port of Spain, 1913, 2♂ (R. Thaxter, MCZ). VENEZUELA *Monagas*: Caripito, Mar. 1942, 1♀ (W. Beebe, AMNH). *Bolívar*: 10 km N Luepa, Gran Sabana, 26 June–11 July 1987, 1,500 m, 1♂ (S. J. Peck, AMNH). *Distrito Federal*: "La Moka" [probably a villa near Caracas; H. Enghoff, personal communication], 1891, 1♀ (ZMK). COLOMBIA *Bolívar*: Cartagena, 21 Dec. 1964, 1♀ (P. R. Craig, CAS). *Cesar*: Curumani, 22 July 1968, 1♂ (B. Malkin, AMNH). *Meta*: ca. 20 km N Río Muco, ca. 20 km S El Porvenir, Finca Chenevo, 170 m, no date, 1♂ (W. Eberhard, MCZ); 15 km SW Puerto Lopez, 200 m, 1972, 1♀ (W. Eberhard, MCZ). *Antioquia*: Cancheras, Mutatá, July 1963, 1♂ (P. B. Schneble, MCZ). *Valle*: 50 km S Buenaventura, Mar. 1973, 2♀ (W. Eberhard, MCZ). EC-UADOR *Sucumbios*: bridge over Río Cuyabeno, on road betw. Tarapoa & Tipishca, 00°01'S, 76°18'W, 25–30 June 1988, 1♀, 1♂ (W. Maddison, MCZ). BRAZIL *Amazonas*: Parque Nacional do Pico da Neblina, 5 Oct. 1990, 1♂ (A. A. Lise, MCP).

Pronous shanus new species

Figures 112–116; Map 4G

Holotype. Male holotype and three female paratypes from Barro Colorado Island, Gatun Lake, Panamá Prov., Panama, June 1950 (A. M. Chickering), in MCZ. The specific name is an arbitrary combination of letters.

Description. Female paratype. Total length 5.0 mm. Carapace 2.0 mm long, 1.8 wide, 0.9 behind lateral eyes. First femur

2.1 mm, patella and tibia 2.2, metatarsus 1.7, tarsus 0.8. Second patella and tibia 2.0 mm, third 1.4. Fourth femur 2.8 mm, patella and tibia 2.6, metatarsus 2.1, tarsus 0.9.

Male holotype. Abdomen elongate as in *P. intus* (Fig. 61). Total length 4.1 mm. Carapace 1.8 mm long, 1.4 wide, 0.6 behind lateral eyes. First femur 2.1 mm, patella and tibia 2.0, metatarsus 1.5, tarsus 0.7. Second patella and tibia 1.5 mm, third 1.3. Fourth femur 2.2 mm, patella and tibia 2.1, metatarsus 1.8, tarsus 0.7.

Note. Males and females were matched on the basis of similar geographical distribution and because both male and female genitalia differed strongly from genitalia of other species of *Pronous*. (Females have been collected with males of the other two Panamanian species, *P. wixoides* and *P. intus*.)

Variation. Some females have the venter and sides of the abdomen black. Total length of females 4.3 to 5.6 mm, males 3.8 to 4.8. The illustrations (Figs. 112–116) were made from the holotype and paratypes.

Diagnosis. Females are easily separated from other species by the rebordered margin of the epigynum (Fig. 112) and, in ventroposterior view, by the transverse, oval median plate having a slight median, longitudinal ridge (Fig. 114). The male differs from the other two sympatric species, *P. intus* and *P. wixoides*, by having a short, thin embolus and the median apophysis with a narrow transverse spine as well as an outer spine at a right angle to the first (at 4 hr in Fig. 116). There is a narrow notch between the outer spine and the median apophysis, best seen in a more median view of the palpus.

Distribution. Panama Canal area (Map 4G).

Paratypes. PANAMA *Panamá*: Barro Colorado Island, Aug. 1936, 1♂ (AMNH ex MCZ); June, 1 Aug. 1939, 2♀, 3♂; July 1950, 1♀, 1♂; Aug. 1950, 1♀ (USNM ex MCZ); Jan. 1958, 1♂ (all A. M. Chickering, MCZ or ex MCZ).

Specimens Examined. PANAMA *Coclé*: El Valle,

July 1936, 1♂ (A. M. Chickering, MCZ). *Panamá*: Arraiján, Aug. 1936, 1♂ (A. M. Chickering, MCZ); Forest Preserve, 29 Jan. 1958, 1♂ (A. M. Chickering, MCZ); Summit, Aug. 1950, 2♀, 1♂ (A. M. Chickering, MCZ); nr. Gamboa, July 1981, 1♂ (W. Eberhard, USNM ex MCZ); July 1984, 1♀ (W. Eberhard 2669, MCZ); Cocoli, 24 Nov. 1954, 1♀ (W. Lundy, AMNH); Farfan, 9 Jan. 1958, 1♀ (A. M. Chickering, USNM ex MCZ); Fort Kobbe, 3 Aug. 1983, 1♂ (H., L. Levi, H. Stockwell, MCZ); Miraflores Locks, 3 Jan. 1958, 1♀ (A. M. Chickering, MCZ).

Pronous valle new species
Figures 117–121; Map 4G

Holotype. Male holotype from near Saladito, 1,700 m, Depto. Valle, Colombia, Mar. 1976 (W. Eberhard 1051), in MCZ. The specific name is a noun in apposition after the locality.

Description. Female paratype. Abdomen lacks an anterior median tubercle, other tubercles small. Total length 5.6 mm. Carapace 2.3 mm long, 1.9 wide, 1.1 behind lateral eyes. First femur 1.9 mm, patella and tibia 2.0, metatarsus 1.5, tarsus 0.8. Second patella and tibia 1.8 mm, third 1.3. Fourth femur 2.5 mm, patella and tibia 2.4, metatarsus 1.9, tarsus 1.0.

Male holotype. Abdomen length between *P. intus* (Fig. 61) and *P. tuberculifer* (Fig. 62). Total length 3.8 mm. Carapace 1.7 mm long, 1.4 wide, 0.7 behind lateral eyes. First femur 1.8 mm, patella and tibia 1.5, metatarsus 1.2, tarsus 0.7. Second patella and tibia 1.4 mm, third 1.1. Fourth femur 1.9 mm, patella and tibia 1.8, metatarsus 1.4, tarsus 0.7.

Note. Males and females were matched on the basis of having been collected from the same locality.

Variation. The male holotype is newly molted and the palpus was preserved when still soft. An older male might have other

areas of the palpus sclerotized and darker than in the one illustrated (Fig. 121).

Diagnosis. The female of *P. valle* differs from females of *P. pance* and *P. tuberculifer* species by having the angle of the epigynum margin on each side more obtuse (Fig. 117) and, in posterior view, the median plate widens dorsally (at 6 hr in Fig. 120). The male differs from other species by having a lightly colored lobe on the outside curvature of the embolus (in center of Fig. 121) and by having an annulate transverse spine on the median apophysis (Fig. 121).

Paratype. COLOMBIA *Valle*: Saladito, 1,700 m, Apr. 1977, 1♀ (W. Eberhard 1162, MCZ).

Pronous pance new species
Figures 122–126; Map 4G

Holotype. Male holotype and one male and five female paratypes from Río Pance, near Cali, 1,100 m, Colombia, 23 Mar. 1970 (W. Eberhard I-290), in MCZ. The specific name is a noun in apposition after the locality.

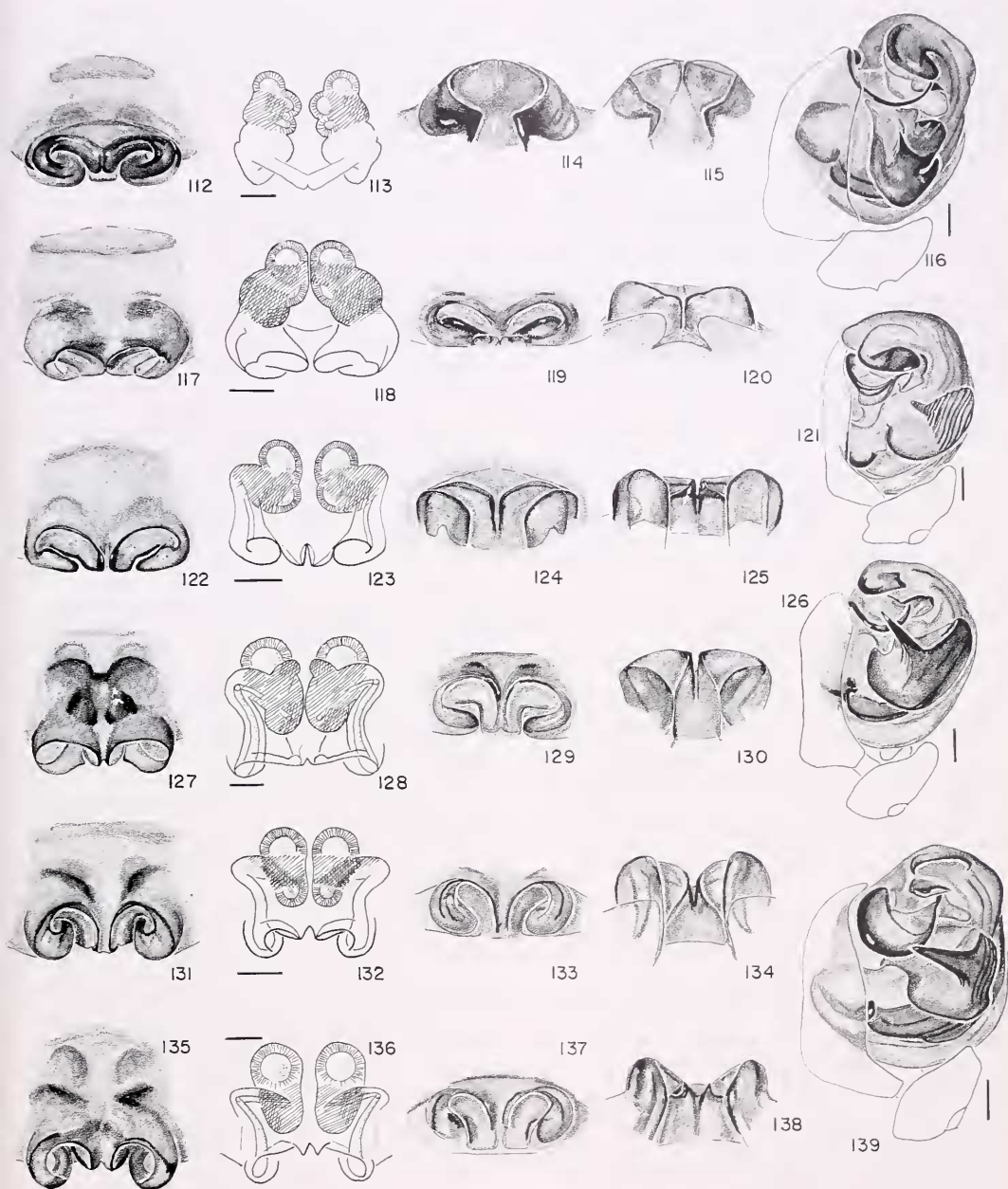
Description. Female paratype. The sides of the carapace are dusky, and there is a median, dorsal gray line on the abdomen. Total length 4.5 mm. Carapace 2.1 mm long, 1.7 wide, 0.9 behind lateral eyes. First femur 1.9 mm, patella and tibia 1.8, metatarsus 1.3, tarsus 0.7. Second patella and tibia 1.7 mm, third 1.3. Fourth femur 2.1 mm, patella and tibia 2.1, metatarsus 1.7, tarsus 0.7.

Male paratype. Abdomen shape between *P. intus* (Fig. 61) and *P. tuberculifer* (Fig. 62). Total length 3.8 mm. Carapace 1.7 mm long, 1.4 wide, 0.7 behind lateral eyes. First femur 1.7 mm, patella and tibia 1.7, metatarsus 1.3, tarsus 0.7.

Figures 112–116. *Pronous shanus* n. sp. 112–115, female epigynum. 112, ventral. 113, ventral, cleared. 114, ventroposterior. 115, posterior. 116, male left palpus.

Figures 117–121. *P. valle* n. sp. 117–120, female epigynum. 117, ventral. 118, ventral, cleared. 119, ventroposterior. 120, posterior. 121, male palpus.

Figures 122–126. *P. pance* n. sp. 122–125, female epigynum. 122, ventral. 123, ventral, cleared. 124, ventroposterior. 125, posterior. 126, male palpus.



Figures 127-130. *P. nigripes* Caporiacco, female epigynum. 127, ventral. 128, ventral, cleared. 129, ventroposterior. 130, posterior.

Figures 131-139. *P. tuberculifer* n. sp. 131-138, female epigynum. 131, 135, ventral. 132-136, ventral, cleared. 133, 137, ventroposterior. 134-138, posterior. 139, male palpus. 131-134, 139, (Peru). 135-138, (Guyana).

Scale lines. 0.1 mm.

Second patella and tibia 1.5 mm, third 1.1. Fourth femur 1.8 mm, patella and tibia 1.8, metatarsus 1.5, tarsus 0.5.

Note. Males and females were collected together.

Variation. Total length of females 4.5 to 4.8 mm.

Diagnosis. The female differs from other species by the semicircular openings and the wide anterior lip of the epigynum (Fig. 122). The male has a short filamentous embolus (Fig. 126), narrower than that of *P. intus* (Fig. 111) and *P. valle* (Fig. 121) and a larger transverse spine on the median apophysis (Fig. 126) than in *P. shanus* (Fig. 116) and *P. valle* (Fig. 121).

Paratype. COLOMBIA *Valle*: Río Pance nr. Cali, 1,100 m, 22 June 1970, 1♀ (W. Eberhard 290, MCZ).

Specimens Examined. COLOMBIA *Cauca*: Río Palacé, Totoró, 1,800 m, oak forest, 24 Mar. 1967, 1♀, uncertain determination (R. Root, W. L. Brown, MCZ).

Pronous nigripes Caporiacco
Figures 127–130; Map 4G

Pronous nigripes Caporiacco, 1947: 25; 1948: 662, figs. 71, 72, ♀, ♂. Female lectotype, immature paralectotype, designated by Levi (1985: 542), from Port Diamond (perhaps Great Diamond, or Diamond Plantation, both 6°43'N, 58°11'W), Guyana, in MZUF, examined. Male paralectotype is *Micrathena acuta* (Walckenaer) (Levi, 1985).

Description. Female lectotype. Coloration as in other species, except sternum light; coxae dark or brown, legs black. Carapace slightly rugose. Total length 4.8 mm. Carapace 1.9 mm long, 1.6 wide, 0.9 behind lateral eyes. First femur 2.0 mm, patella and tibia 2.0, metatarsus 1.5, tarsus 0.7. Second patella and tibia 1.8 mm, third 1.3. Fourth femur 2.7 mm, patella and tibia 2.4, metatarsus 2.1, tarsus 0.8.

Variation. Total length of females 4.7 to 4.8 mm. The illustrations (Figs. 127–130) were made from the lectotype.

Diagnosis. The pair of black patches within the dusky patch of the epigynum (Fig. 127) separate this species from *P. tuberculifer*, *P. intus*, and other South American species. Unlike *P. tuberculifer*, *P. nigripes* has the openings in posterior

view of the epigynum with their long axis transverse (Fig. 130). The epigynum lacks overhang above the openings (Fig. 127).

Specimens Examined. GUYANA Tumatumari, 21 July 1936, 1♀ (MZUF).

Pronous tuberculifer Keyserling

Plate 2, Figures 57, 62, 131–139; Map 4D

Pronous tuberculifer Keyserling, 1881: 548, pl. 16, fig. 1, ♀, ♂. Male lectotype and two female paralectotypes from Amable María [Depto. Junín], Peru, in PAN, examined; Keyserling, 1892: 35, pl. 2, fig. 31, ♀, ♂.

Note. Simon (1895: 863, figs. 922–924), Bonnet (1958: 3778) and Roewer (1942: 967) erroneously considered all American specimens, and all citations of the genus *Pronous*, to refer to *P. tuberculifer*.

Description. Female from Tingo María, Peru. Abdomen lacking anterior median tubercle; other tubercles small (Fig. 57). Total length 5.4 mm. Carapace 2.2 mm long, 1.8 wide, 1.0 behind lateral eyes. First femur 1.9 mm, patella and tibia 2.0, metatarsus 1.5, tarsus 0.7. Second patella and tibia 1.8 mm, third 1.3. Fourth femur 2.5 mm, patella and tibia 2.3, metatarsus 1.9, tarsus 0.8.

Male from Tingo María, Peru. Abdomen as in Figure 62. Total length 3.7 mm. Carapace 1.8 mm long, 1.5 wide, 0.7 behind lateral eyes. First femur 1.7 mm, patella and tibia 1.7, metatarsus 1.3, tarsus 0.7. Second patella and tibia 1.3 mm, third 1.1. Fourth femur 2.0 mm, patella and tibia 1.8, metatarsus 1.7, tarsus 0.7.

Note. Males and females were paired in the original description, and both belong to the only species of *Pronous* collected so far in Peru.

Variation. Total length of females 3.9 to 5.4 mm, males 3.3 to 4.6. The female illustrated (Figs. 131–134) came from Tingo María, Peru, the male (Fig. 139) from the Depto. Amazonas, Peru, and Figures 135–138 from Guyana.

Diagnosis. The epigynum differs from that of other *Pronous* by having a V-shaped

dusky patch and by the lateral overhang covering the openings (Figs. 131, 135). In posterior view the longest diameter of the opening is longitudinal (Figs. 131, 135); in others it is transverse (Fig. 130). The embolus is almost semicircular (it may be transparent; Fig. 139); a similar embolus is found only in the Mexican *P. beatus*. Also, unlike all other species, *P. tuberculifer* has the conductor with a small cylindrical projection directed to the right (in a left palpus pointing toward 3 hr in Fig. 139) and a short tegulum lobe (Fig. 139).

Natural History. The male from Alto Río Comaina came from secondary vegetation at the border of a swamp.

Distribution. Guyana, Amazon area to Misiones Prov., Argentina. Male specimens (readily determined) have been found in Minas Gerais, Brazil, and in Paraguay and Bolivia (Map 4D).

Specimens Examined. GUYANA Mackenzie [06°00'N, 58°17'W], 10 km below Three Friends on Demerara River, 55 m el. (Stephens and Traylor, 1985), Sept. 1931, 1♀ (MZUF). COLOMBIA *Putumayo*: Río Putumayo, nr. Puerto Asis, no date, 1♀ (W. Eberhard 434, MCZ). ECUADOR *Sucumbios*: bridge over Río Cuyabeno on road betw. Tarapoa & Tipishca, 0°01'S, 76°18'W, 8–9 Aug. 1988, 1♀ (W. Maddison, MCZ); Reserva Faunística Cuyabeno, Laguna Grande, Sendero La Hormiga, 00°00', 76°10'W, 2–5 Aug. 1988, 2♀ (W. Maddison, MCZ). *Napo*: Pampeya, Río Napo, May 1965, 2♀ (L. Peña, MCZ). *Pichincha*: Cayambe, 2,300 m, June 1965, 1♂ (L. Peña, MCZ). *Zamora Chinchipe*: Río Jumbué, 1 June 1965, 1♂ (L. Peña, MCZ). PERU *Amazonas*: Alto Río Comaina, Puesto de Vigilancia, 22, Falso Paquisha, 850–1,150 m, 21 Oct.–3 Nov. 1987, 1♂ (D. Silva D. MUSM). *Huánuco*: Cucharas, Huallaga Valley, Feb.–Apr. 1954, 1♀ (F. Woytkowski, CAS); Tingo María, 26 May 1947, 1♀, 1♂ (J. C. Pallister, AMNH), 2 June 1967, 1♀ (A. F. Archer, S. Risco, AMNH); Monzón Valley nr. Tingo María, 10 Nov. 1954, 2♀ (E. S. Ross, E. I. Schlinger, CAS). BRAZIL *Amazonas*: Reserva Porto Alegre, 80 km N Manaus, 27 May 1992, 1♀ (H. G. Fowler, MCZ). *Paraíba*: Independência, 1911, 1♀ (W. M. Mann, MCZ). *Pernambuco*: Pernambuco [Recife], (SMF). *Minas Gerais*: Mina Serinha, Diamantina, Dec. 1944, 1♂ (E. Cohn, AMNH). *Paraná*: Cataratas do Iguaçu, 18–25 Mar. 1985, 2♀ (H. L. Levi, MCZ). PARAUGAY *Concepción*: Apa, Jan.–Feb. 1909, 1♂ (AMNH). *Cordillera*: San Bernardino, 1♀ (E. Reimoser, MCZ). BOLIVIA *El Beni*: Estac. Biol. Beni, 14°47'S, 65°15'W, 225 m, 8–14 Nov. 1989, 1♂ (J. Coddington et al., USNM). ARGENTINA *Misiones*: Montecarlo, Jan. 1966, 1♀ (M. E. Galiano, MEG).

Spilasma Simon

Spilasma Simon, 1895: 794, fig. 856, ♂ abdomen, fig. 857 ♀ eye region. Type species *Spilasma artifex* Simon, 1895 (= *S. duodecimguttata* (Keyserling, 1880)) by original designation and monotypy. The gender of the name is feminine (Bonnet, 1958: 4121).

Diagnosis. *Spilasma* has a narrow cephalic region of the carapace (Figs. 146, 154) as in *Cyclosa* and *Acacesia*. *Spilasma* differs from *Cyclosa* by having few setae on the carapace and lacking the dark rings on the legs (Fig. 145). *Spilasma* differs from both *Cyclosa* and *Acacesia* by having an oval abdomen, widest in the middle, with six dorsal pairs of white patches, and differs from many araneids by having no markings in the midline of the abdomen and no folium pattern (Fig. 145).

Description. Cephalothorax glabrous, orange to orange-brown without marks. Abdomen oval, widest in middle, with dorsal paired patches of white (Fig. 145) and no ventral markings. Posterior median eyes subequal to anterior medians and their diameter or less apart. The epigynum has a ventrally extending lobe (Figs. 140, 142) with posterior sculpturing (Fig. 143).

Male smaller than female, with ventral sclerotized area from sides of pedicel to genital groove (Fig. 153). Endite without tooth, no coxal hook. Palpal patella with two weak setae. Second tibia thinner than first.

Relationship. *Spilasma* can be placed with the *Alpaida* group of species, on the basis of the following characters: the epigynum is lobe-shaped (Figs. 140–144); the tegulum is free in the upper right corner of the left palpus (T in Fig. 151); the conductor is in the middle of the tegulum, not the upper right in the left palpus (C in Fig. 151); the median apophysis is without spines or flagella (except distally) and projects beyond bulb of palpus (M in Fig. 151); in the upper left of the conductor (in the left palpus) there is a pocket (C in Fig. 161), which may be a homolog with the paramedian apophysis. The narrow cephalic region of the carapace is probably a synapomorphy with *Acacesia* Simon



Plate 3. *Spilasma duodecimguttata*. Web diameter of upper web about 25 cm, lower one 10.4 cm (upper photos, R. L. C. Baptista; lower photo, J. A. Coddington).

(Glueck, 1994) and perhaps also with *Cy-closa*.

Natural History. The web is horizontal, pulled up at the hub, with sticky threads (W. Eberhard, personal communication) and, above the hub, a median granular retreat, with sand grains, having a lateral flap (Pl. 2). The flap pulls in when disturbed. The retreat is also used to house the eggsacs (Lubin, 1978).

Distribution. There are three American species, with only one specimen each available for two of them, from Honduras to Rio de Janeiro State, Brazil. *Spilasma africana* Simon, 1903, from Spanish Guinea, is the only described species not from America. The specimens of *S. africana* are lost, and the species was synonymized with

Prasonica seriata Simon, 1895, by Grashoff (1971). *Prasonica* is a genus related to *Mangora*.

KEY TO *SPILASMA* SPECIES

The female of *S. utaca* and the male of *S. baptistai* are not known.

1. Males 2
- Females 3
- 2(1). A pair of deep longitudinal grooves on carapace (Fig. 161); base of embolus with duct making two loops (Fig. 160); Peru (Map 5) *utaca*
- Carapace without grooves (Fig. 152); embolus duct with one loop (Figs. 149-151); from Honduras to Bolivia and southern Brazil (Map 5) *duodecimguttata*
- 3(1). In posterior view of epigynum, slit-shaped openings face laterally (Fig. 157); Per-nambuco, Brazil (Map 5) *baptistai*

Map 5. Distribution of *Spilasma* species.

- In posterior view of epigynum, slit-shaped openings face anteromedially (Figs. 141, 143); Honduras to Bolivia and south-eastern Brazil *duodecimguttata*

***Spilasma duodecimguttata* (Keyserling)**
Plate 3; Figures 140–155; Map 5

Singa duodecimguttata Keyserling, 1880: 302, pl. 4, fig. 6, ♀. Female holotype from New Granada [old name for Colombia], in BMNH, examined. Keyserling, 1893: 286, pl. 14, fig. 211, ♀. Roewer, 1942: 877.

Epeira lamentaria Keyserling, 1883: 199, pl. 15, (?fig. 5); 1892: 174, pl. 8, (?fig. 128). Female holotype from Amazon Prov., Brazil at HECO, examined. NEW SYNONYMY.

Spilasma tredecimguttata Simon, 1895: 789, figs. 856, 857, ♂ abdomen, ♀ eyes; 1897: 476. Many male and female syntypes from the Amazon in MNHN no. 1010, examined. Roewer, 1942: 776. Bonnet, 1958: 4121. NEW SYNONYMY.

Spilasma artifex Simon, 1895: 794; 1897: 477, pl. 12, figs. 1–5, pl. 13, fig. 1, web. Female holotype from San Esteban, Venezuela, MNHN no. 10127, examined. Roewer, 1942: 776. Bonnet, 1958: 4121. NEW SYNONYMY.

Epeira davisi Hingston, 1932: 365, fig. 40, web. Spec-

imens from Guyana, in BMNH, lost. NEW SYNONYMY.

Aranea lamentaria:—Roewer, 1942: 845.

Araneus duodecimguttatus:—Bonnet, 1955: 449.

Araneus lamentarius:—Bonnet, 1955: 526.

Spilasma coccineum Caporiacco, 1955: 344, fig. 29, ♂. Male holotype from Rancho Grande, Venezuela, in UCVC, not examined. Brignoli, 1983: 280. NEW SYNONYMY.

Note. The small illustration of Keyserling (1883, fig. 5; and the same in 1892, fig. 128) does not look like the epigynum of this species. Keyserling may have illustrated an artifact or debris. Caporiacco's (1955) illustration of the male palpus of *S. coccineum* is good.

Lopez (1985: 86) described a new species, *Spilasma richei*, collected along the path from Roura to Kaw, southeast of Cayenne, French Guyana. He placed it in the Museum de Béziers, France, but it has been lost (Lopez, 1986, personal communication). Few diagnostic characters are provided for *S. richei* except for noting the difference in "la spinulation des pattes et

la form précise de l'epigyne", but a detailed description is forthcoming (Lopez, 1985: 87). This is considered a *nomen nudum*. It is also not listed in Platnick's catalogs (1989, 1993).

The genitalia of *S. duodecimguttata* are quite variable. When many specimens from different locations are available, one readily sees the reason for the many synonymies cited here.

Epeira davis was erroneously placed in *Cyrtophora* by Levi (1991b: 179).

Description. Female from Depto. Meta, Colombia. Carapace, chelicerae, labium, endites, sternum, legs, bright orange. Dorsum of abdomen orange, with a gray cast, with six pairs of symmetrical white patches (Fig. 145); venter darker gray. Posterior median eyes same diameter as anterior medians, laterals 0.7 diameter. Anterior median eyes 0.3 diameter apart, 0.8 diameter from laterals. Posterior median eyes 0.5 diameter apart, 1.1 diameters from laterals. Ocular rectangle, slightly longer than wide. Height of clypeus equals 0.4 diameter of anterior median eye. Sternum slightly wider than long. Abdomen oval, widest anterior of middle (Fig. 145). Total length 4.5 mm. Carapace 2.0 mm long, 1.9 wide, 0.8 behind lateral eyes. First femur 2.3 mm, patella and tibia 2.3, metatarsus 1.3, tarsus 1.0. Second patella and tibia 2.0 mm, third 1.2, fourth 2.0.

Male from Depto. Meta, Colombia. Color as in female. Distal leg articles darkest. Posterior median eyes 0.7 diameter of anterior medians, laterals 0.5 diameter. Anterior median eyes 0.2 diameter apart, 0.6 diameter from laterals. Posterior median eyes 0.7 diameter apart, 1.2 diameters from laterals. Height of clypeus equals the diameter of an anterior median eye. Abdomen widest in middle, with a soft, but

sclerotized shield in the area anterior to the genital groove (Fig. 153). Total length 3.2 mm. Carapace 1.6 mm long, 1.3 wide, 0.5 behind lateral eyes. First femur 1.6 mm, patella and tibia 1.6, metatarsus 1.0, tarsus 0.7. Second patella and tibia 1.4 mm, third 0.9, fourth 1.3.

Note. Males and females have been collected together.

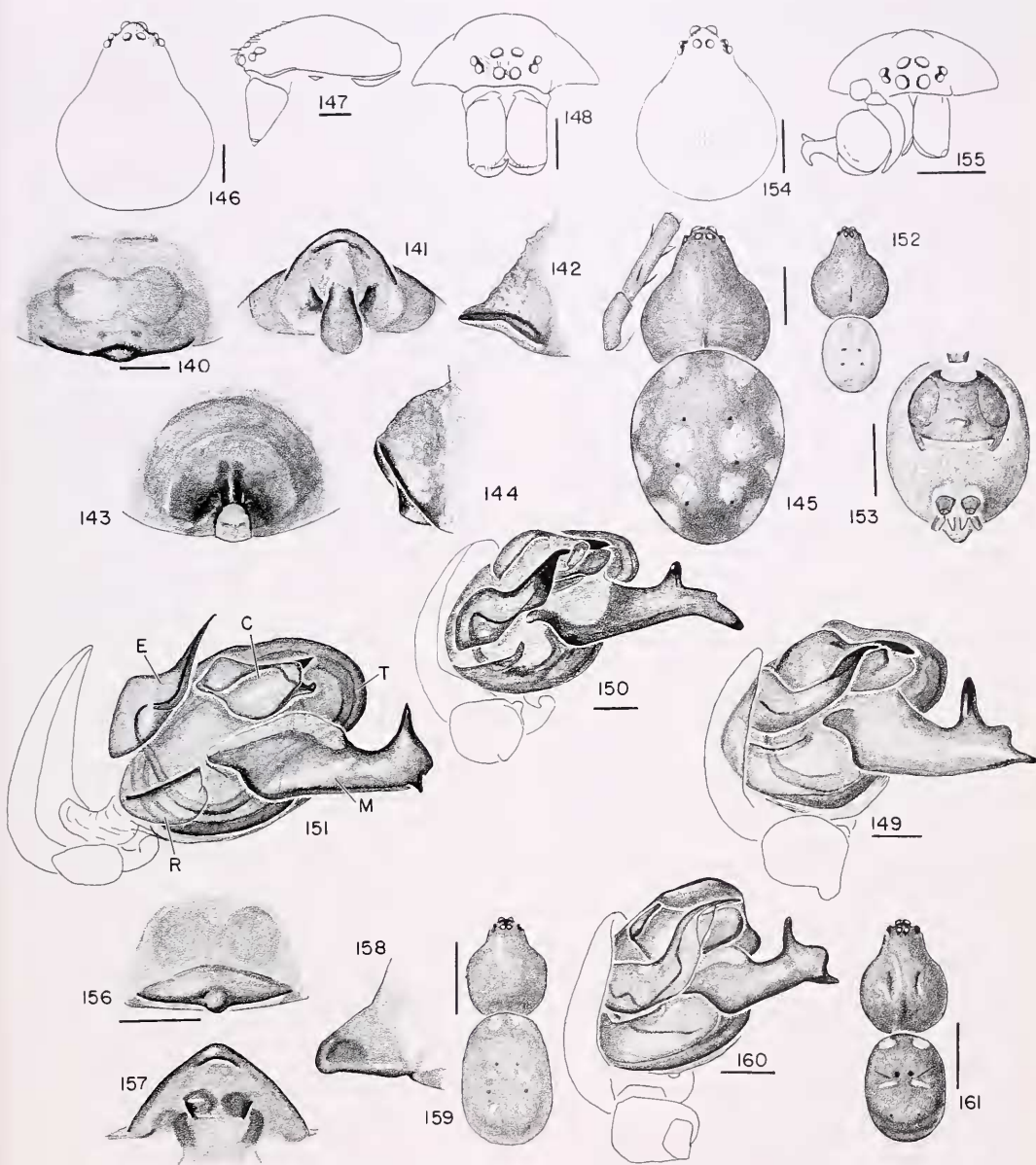
Variation. The genitalia of no two specimens look quite alike, and each new specimen makes one think they have a new species. Most variation is in the protuberance of the epigynum: some having a semi-circular keel (Figs. 140–142), some not (Figs. 143, 144). The male palpus also varies in structure. The tip of the median apophysis and the curvature of the embolus are unusually variable (Figs. 149, 150). Some individuals lack white patches on the abdomen. Total length of females 3.0 to 7.0 mm, males 2.2 to 3.6. Most illustrations were made from specimens from Depto. Meta, Colombia, but Figures 143–145 and 150 were made from specimens from 80 km north of Manaus, Brazil.

Diagnosis. The first femur and patella-tibia are of about the same length, unlike those of most other araneids. The epigynum differs from *S. baptistai* by having the slit openings face anteriomedially (Figs. 141, 143); the male differs from *S. utaca* by lacking the pair of grooves on the carapace (Fig. 161). The male palpus superficially resembles that of *Ocrepeira yaelae* Levi (1993a, fig. 359).

Natural History. *Spilasma duodecimguttata* is found in foliage of wet forest in Guapiles, Costa Rica; in lowland forest, El Dorado, Venezuela; in rain forest near Leticia, Colombia; in secondary forest by a lake 15 km southwest of Puerto Lopez, Colombia; in forest interior in reserves

Figures 140–155. *Spilasma duodecimguttata* (Keyserling). 140–148, female. 140–144, epigynum. 140, 143, ventral. 141, posterior. 142, 144, lateral. 145, dorsal. 146, carapace. 147, carapace and cheliera. 148, eye region and chelicerae. 149–155, male. 149–151, left palpus. 149, 150, mesal. 151, pulled apart. 149, 151, (Depto. Meta, Colombia). 151, (N of Manaus, Brazil). 152, dorsal. 153, abdomen ventral. 154, carapace. 155, eye region, chelicerae and right palpus.

Figures 156–159. *S. baptistai*, female. 156–158, epigynum. 156, ventral. 157, posterior. 158, lateral. 159, dorsal.



Figures 160, 161. *S. utaca*, male. 160, palpus. 161, dorsal.

Abbreviations. C, conductor. E, embolus. M, median apophysis. R, radix. T, tegulum.

Scale lines. 1 mm, genitalia 0.1 mm, except Figures 146-148, 153-155, 0.5 mm.

north of Manaus, Brazil. In Rio de Janeiro, Brazil, a web was found to be 40 cm above ground.

Distribution. Honduras to Rio de Janeiro State, Brazil, and Bolivia (Map 5).

Specimens Examined. HONDURAS *Atlántida*: Lancetilla, ♀ (MCZ). COSTA RICA *Limón*: 5.5 km E Guapiles, ♂ (DU). *Heredia*: Finca La Selva, ♀, ♂ (CAS, MCZ). *Puntarenas*: Reserva Carara nr. Tarcoles, ♀ (MCZ). *Cartago*: Turrialba, ♂ (AD). PANAMA *Panamá*: Barro Colorado Island, ♀, ♂ (MCZ); Cerro Galero, ♂ (MCZ). WEST INDIES *Trinidad*: Old Gold Mine, Arima Ward, ♀ (USNM). VENEZUELA *Aragua*: Rancho Grande, ♂ (AMNH), ♀ (MCZ), ♀, ♂ (USNM). *Bolívar*: 22 km S El Dorado, ♂ (AMNH). *Falcón*: 3 km S El Hondo de Uria, 15 km E Curimagua, ♀ (MCZ). GUYANA Shudikar River, Upper Essequibo River, ♂ (AMNH); Upper Essequibo River, Onoro Region, ♀ (AMNH); Essequibo River opposite Twasinki Mtns., imm. (AMNH); Upper Essequibo River, nr. Akaramukra Rapids, ♂ (AMNH). SURINAM *Saramacca*: Voltzberg Raleighvallen Nature Reserve, ♀ (MCZ). FRENCH GUIANA nr. Camp Calman, Montagnes Kaw, ♀ (USNM). COLOMBIA *Santander*: Carare, Opon Capote 6°38'N, 73°55'W, ♂ (MCZ). *Meta*: 15 km SW Puerto Lopez, ♀, ♂ (MCZ). *Valle*: 28 km E Buenaventura, ♂ (MCZ); Central Anchicaya, ♀ (MCZ). *Putumayo*: Río Putumayo, nr. Pto. Asis, ♀ (MCZ). *Amazonas*: Amacayacu, 48 km NW Leticia, ♂ (MCZ); 18 km N Leticia, ♂ (AMNH); Leticia, ♀, ♂ (CAS). ECUADOR *Sucumbios*: Reserva Faunística Cuyabeno, ♀ (MCZ, MECN). *Napo*: Río Coca and Napo, ♂ (MCZ); 48.6 km NE Baeza, ♂ (MCZ). PERU *Huánuco*: Panguana, Río Pachitea, 9°37'S, 74°56'W, ♀ (MCZ); Monzón Valley, Tingo María ♀, ♂ (CAS); Dantas La Molina, Quebrada Sapote, SW Puerto Inca, 270 m, 9°38'S, 75°00'W, 1♀ (MUSM). *Madre de Dios*: Zona Reserva de Manu, ♀ (USNM); 15 km E Puerto Maldonado, ♂ (CAS); Res. Tambopata, 12°50'S, 69°17'W, ♀, ♂ (USNM). BRAZIL *Roraima*: Ilha de Maracá, ♀, ♂ (INPA). *Amazonas*: Cabo Frio Reserve, 80 km N Manaus, ♀, ♂ (INPA, MCN, MCZ); Colosso Reserve, 80 km N Manaus, ♀, ♂ (INPA, MCN, MCZ); Dimona Reserve, 80 km N Manaus, ♀, ♂ (MCZ); Gavião Reserve, 80 km N Manaus, ♂ (MCZ); Km 41 Reserve, 80 km N Manaus, ♀, ♂ (MCZ); Fazenda Esteio, Manaus, ♂ (INPA); Belém, periodically flooded forest, nr. confluence with Río Solimões, ♂ (AMNH); Manaus, ♀, ♂ (MACN); Reserva Porto Alegre, 80 km N Manaus, ♀ (MCZ); Reserva Ducke nr. Manaus, ♀ (MCN, INPA); Parque Nacional do Pico da Neblina, Maturacá, ♀ (MCP). *Pará*: Canindé, ♀ (AMNH). *Bahia*: Encruzilhada, ♂ (AMNH); Fazenda Matiapã, Camacan, ♂ (MCN). *Mato Grosso*: Barra de Tapirapé, ♂ (AMNH, MCZ); Chapada dos Guimarães, ♀ (AMNH); Sinop, ♂ (AMNH); Villa Vera, 55°30'S, 12°46'W, ♂ (AMNH). *Rio de Janeiro*: Mangaratiba, ♂ (AMNH); Barra da Tijuca, ♀ (RLCB); Morro da Urca, ♀ (RLCB). BOLIVIA *El Beni*: 27 km SW Yucumo, 500 m, 15°50'S, 69°17'W, ♂ (USNM).

Spilasma baptistai new species
Figures 156–159; Map 5

Holotype. Female from Dois Irmãos Reservation, Recife, Pernambuco State, Brazil, 25 Jan. 1989 (R. L. C. Baptista, A. P. Chaves 2654) in MZSP. The species is named after the collector.

Description. Female holotype. Carapace, chelicerae, sternum, labium, and endites orange. Legs orange, distal articles darkest. Dorsum of abdomen with pairs of white patches (Fig. 159); venter gray. Eyes small. Posterior median eyes 0.8 diameter of anterior medians, laterals 0.8 diameter. Anterior median eyes 0.2 diameter apart, 1 diameter from laterals. Posterior median eyes 1 diameter apart, 1.3 diameters from laterals. Ocular quadrangle slightly longer than wide, slightly wider behind. Height of clypeus equals 0.5 diameter of the anterior median eye. Abdomen oval (Fig. 159). Total length 3.0 mm. Carapace 1.40 mm long, 1.19 wide, 0.57 behind lateral eyes. First femur 1.30 mm, patella and tibia 1.32, metatarsus 0.67, tarsus 0.52. Second patella and tibia 1.19 mm, third 0.71, fourth 1.10.

Diagnosis. The eyes are smaller than those of *S. duodecimguttata* (Fig. 159) and in posterior view of the epigynum, the median plate (Fig. 157) is relatively wider than that of *S. duodecimguttata* (Figs. 141, 143), and the openings face laterally (Fig. 157).

Natural History. The specimen was collected with its retreat. Vestiges of the web were projecting from refuge between leaves of a bush, 1.5 m above ground in secondary forest.

No other specimens were found.

Spilasma utaca new species
Figures 160, 161; Map 5

Holotype. Male holotype from 1,600 to 2,200 m, Utcuyacu [above Merced, 1,465 m, 11°12'S, 75°28'W; Stephens and Traylor, 1983], Depto. Junín, Peru, 4 Apr. 1948 (F. Woytkowski), in AMNH. The specific name is an arbitrary combination of letters.

Description. Male holotype. Carapace dark orange-brown. Chelicerae, labium,

endites, sternum dark brown. Coxae brown, except posterior half of fourth coxae, which are light yellowish; legs dark brown. Dorsum of abdomen black with two pairs of white spots, the first round, the second diamond-shaped, and with transverse posterior dark bands (Fig. 161); venter black. Posterior median eyes 0.7 diameter of anterior medians, anterior laterals 0.7 diameter, posterior 0.6. Anterior median eyes 0.2 diameter apart, 0.4 diameter from laterals. Posterior median eyes 0.4 diameter apart, 1.2 diameters from laterals. Ocular quadrangle narrower behind than in front. Height of clypeus equals 0.7 diameter of anterior median eye. Sternum corniculate. Abdomen oval, widest behind middle (Fig. 161). Total length 3.0 mm. Carapace 1.59 mm long, 1.19 wide, 0.53 wide behind lateral eyes. First femur 1.00 mm, patella and tibia 1.72, metatarsus 0.87, tarsus 0.69. Second patella and tibia 1.56 mm, third 0.93, fourth 1.45.

Diagnosis. The carapace of *S. utaca* has a pair of grooves (Fig. 161) not present in *S. duodecimguttata* (Fig. 152), and the duct loops twice in the proximal end of the embolus (Fig. 160).

No other specimens were found.

Micrepeira Schenkel

Micrepeira Schenkel, 1953: 26. Type species *M. albomaculata* Schenkel by monotypy. The gender of the name *Micrepeira* is feminine.

Diagnosis. *Micrepeira* differs from most other araneid genera, including *Araneus* and *Singa* by the domed sternum (Figs. 186, 191) and a subspherical abdomen with bold, white dorsal markings: often a wide median, longitudinal band and a wide transverse band or a few pairs of transverse patches, but no white markings on the venter (Figs. 165, 176, 185, 190, 195, 204). Also in *Micrepeira*, the femora are the same length as the adjacent patella and tibia; in other genera, the femora are shorter. *Micrepeira* resembles the Indo-Pacific *Anepsion* Strand, 1929 (Chrysanthus, 1969), but has a narrower cephalic region. It resembles the African *Pherence*

Thorell, 1899, but has a low clypeus, less than the diameter of the anterior median eye. *Micrepeira* differs from all similar genera by the following: the epigynum has a wide shelf, resembling that of *Alpaida*, with a tiny, soft, distal, pointed scape, easily overlooked (Figs. 162, 192, 200), by the male palpus, which has a large median apophysis bearing two flagella (Figs. 168, 177, M in Fig. 179), and a conductor either on the edge or inward on the tegulum, and no terminal apophysis or embolus lamella (Figs. 179, 180). The median apophysis flagella are, as usual, associated with a pointed scape of the female epigynum.

Description. Female. Cephalothorax glabrous, orange to brown without distinct marks, cephalic region wide (Figs. 166, 167). Eyes subequal. Median ocular quadrangle almost square. Height of clypeus 0.6 to 0.8 diameter of the anterior median eye. Legs relatively short and thick (Fig. 204).

Males much smaller than females (Fig. 181), width behind eye region less than half width of carapace. Endite with small tooth (*M. fowleri*) or none (*M. hoeferi*), no tubercle or tooth on palpal femur. No hook on first coxa, palpal patella with one macroseta. Second tibia as thick as or thinner than first, without any large macrosetae. Median apophysis of palpus has two proximal flagella associated with a pointed scape of the epigynum.

Relationship. The broad lobe of the epigynum, the palpus with a bare tegulum (at 1–2 hr in Fig. 168), the lack of distal hematodocha, the lack of terminal apophysis or embolus lamella, and the single macroseta on the palpal patella place the genus close to *Alpaida*. But the tiny, pointed scape of the epigynum (Figs. 162–164) and the two flagella of the median apophysis (Fig. 168, M in Fig. 179) suggest relationship with *Kaira*, *Aculepeira*, *Amazonpeira*, and *Metepeira*, all genera closer to *Araneus*. Although the pointed scape and flagella on the median apophysis were previously considered synapomorphies, evidence now indicates that this may be a homoplasious character, as the make-up of

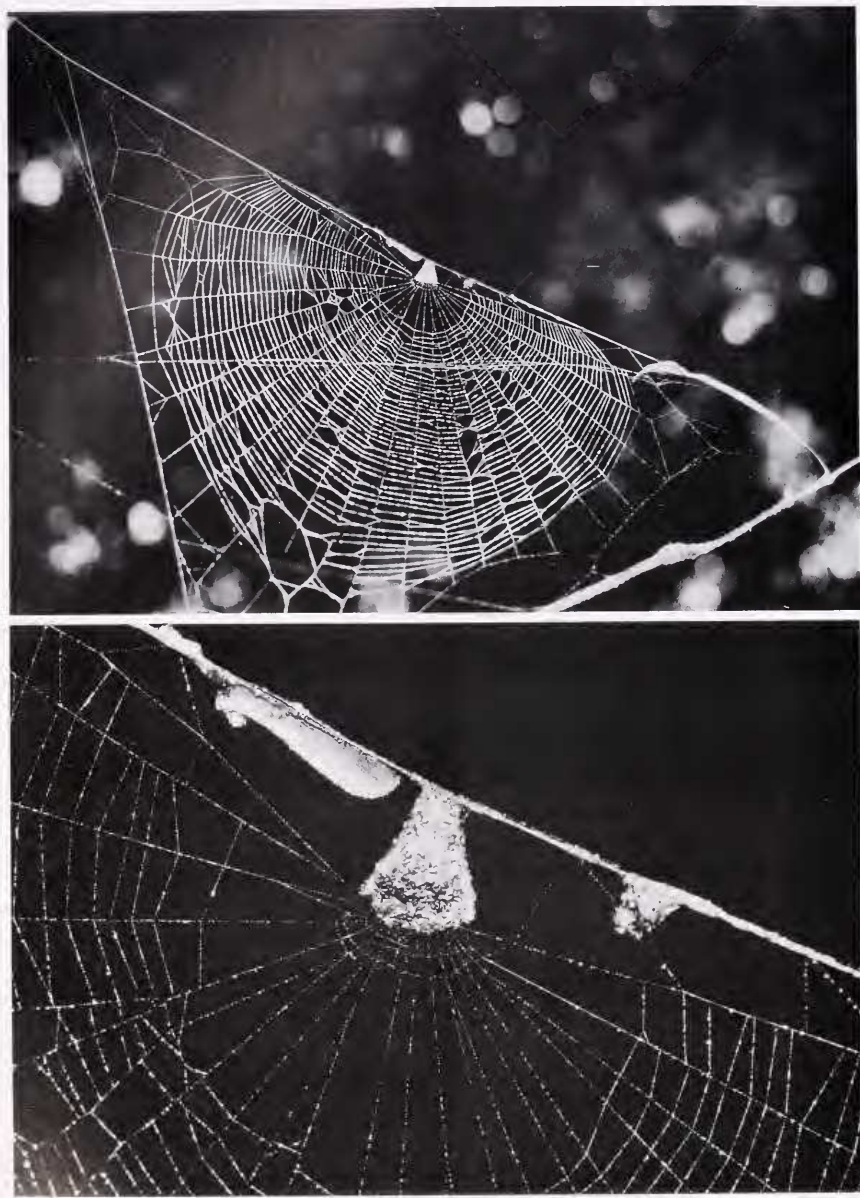
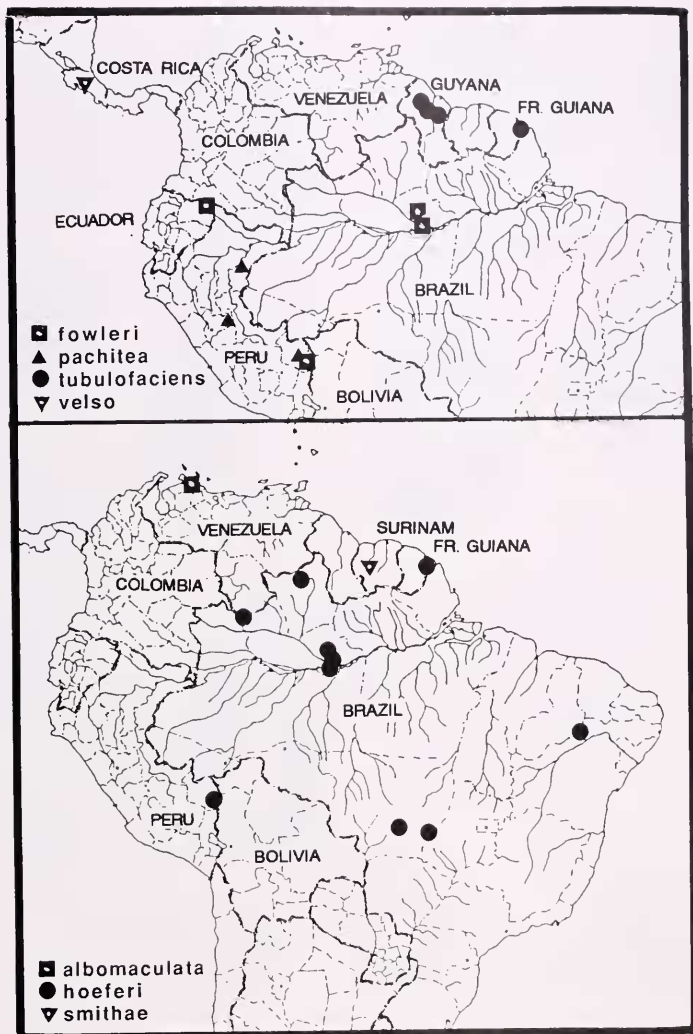


Plate 4. *Micrepeira hoeferi* n. sp. Diameter of web 20 cm, hub of web 150 cm above forest floor (photo, H. Höfer).

the genitalia of *Micrepeira* resembles so much more that of *Alpaida*. The position of the conductor (C in Figs. 179, 180, at 1 hr in Fig. 177 and at 11 hr in Fig. 178) is on the edge of the tegulum but is at the

distal end and not above the median apophysis as in *Araneus*.

Natural History. Webs are known of three species (*M. hoeferi*, *M. tubulofaciens*, and *M. velso*). All have the shape

Map 6. Distribution of *Micrepeira* species.

of the lower half of a circle hanging on a line with a retreat above the hub (Pl. 4). The retreat is made of detritus and silk and has a lid that can be closed (Höfer note on label with specimen of *M. hoeferi*). At its pointed end, the retreat has two strong silk support lines covered by some detritus.

Distribution. All seven species are Central and South American (Map 6).

KEY TO MICREPEIRA SPECIES

Males of *M. albomaculata*, *M. pachitea*, *M. smithae*, *M. tubulofaciens*, and *M. velso* are unknown.

- | | | |
|-------|--|----------------|
| 1. | Male | 2 |
| - | Female | 3 |
| 2(1). | Middle of median apophysis with a lobe (Fig. 168); Amazonian Ecuador to Manaus region of Brazil (Map 6) | <i>fowleri</i> |
| - | Middle of median apophysis without lobe (M in Figs. 177-180); Guianas to Peru, Mato Grosso, Brazil (Map 6) | <i>hoeferi</i> |

- 3(1). Sternum with an anterior longitudinal groove (Fig. 191); Peruvian Amazon (Map 6) *pachitea*
 - Sternum without such groove (Fig. 186) 4
 4(3). Epigynum in ventral view a convex lobe (Fig. 200); Falcón State, Venezuela (Map 6) *albomaculata*
 - Epigynum flat (Figs. 162, 171, 182, 187, 192, 196) 5
 5(4). Epigynum posterior median plate overhanging laterals as in Figure 197; Costa Rica (Map 6) *velso*
 - Posterior median plate otherwise; South America 6
 6(5). Epigynum with posterior margin straight in ventral view and with narrow scape (Figs. 171, 174); Guianas, to Peru, and Mato Grosso, Brazil (Map 6) *hoeferi*
 - Epigynum more or less triangular in ventral view or a triangular scape (Figs. 162, 182, 192) 7
 7(6). Triangle formed by epigynum taking up most of posterior margin of epigynum (Figs. 162, 182) 8
 - Triangle formed by epigynum making up less than half of posterior margin of epigynum (Fig. 192); Surinam (Map 6) *smithae*
 8(7). Epigynal lobe marked as in Figure 182; Guianas (Map 6) *tubulofaciens*
 - Epigynum without dark marks (Fig. 162); Amazonian Ecuador to Manaus region of Brazil (Map 6) *fowleri*

Micrepeira fowleri new species Figures 162–170; Map 6

Holotype. Female holotype from 80 km north of Manaus, Km 41 Reserve, forest interior, Amazonas State, Brazil, 14 Apr. 1991, 200 m (H. G. Fowler, E. Venticinque, R. S. Vieira), in MCN no. 25536. The species is named after the collector.

Description. Female holotype. Carapace orange. Chelicerae, labium, endites orange. Sternum dusky orange. Coxae orange; legs dusky orange, darker distally. Dorsum of abdomen dark dusky with a longitudinal, median band of white pigment patches and a pair of white patches; posterior black with a pair of small posterior patches (Fig. 165); venter dusky with a median darker band from epigynum to spinnerets. Posterior median eyes 0.8 diameter of anterior medians, laterals 0.6 diameter. Anterior median eyes 0.4 diameter apart, 1 diameter from laterals.

Posterior median eyes 0.7 diameter apart, 1.5 diameters from laterals. Total length 3.0 mm. Carapace 1.36 mm long, 1.24 wide, 0.75 behind lateral eyes. First femur 1.18 mm, patella and tibia 1.18, metatarsus 0.62, tarsus 0.54. Second patella and tibia 1.09 mm, third 0.65, fourth 1.03. First tibia 0.22 mm thick.

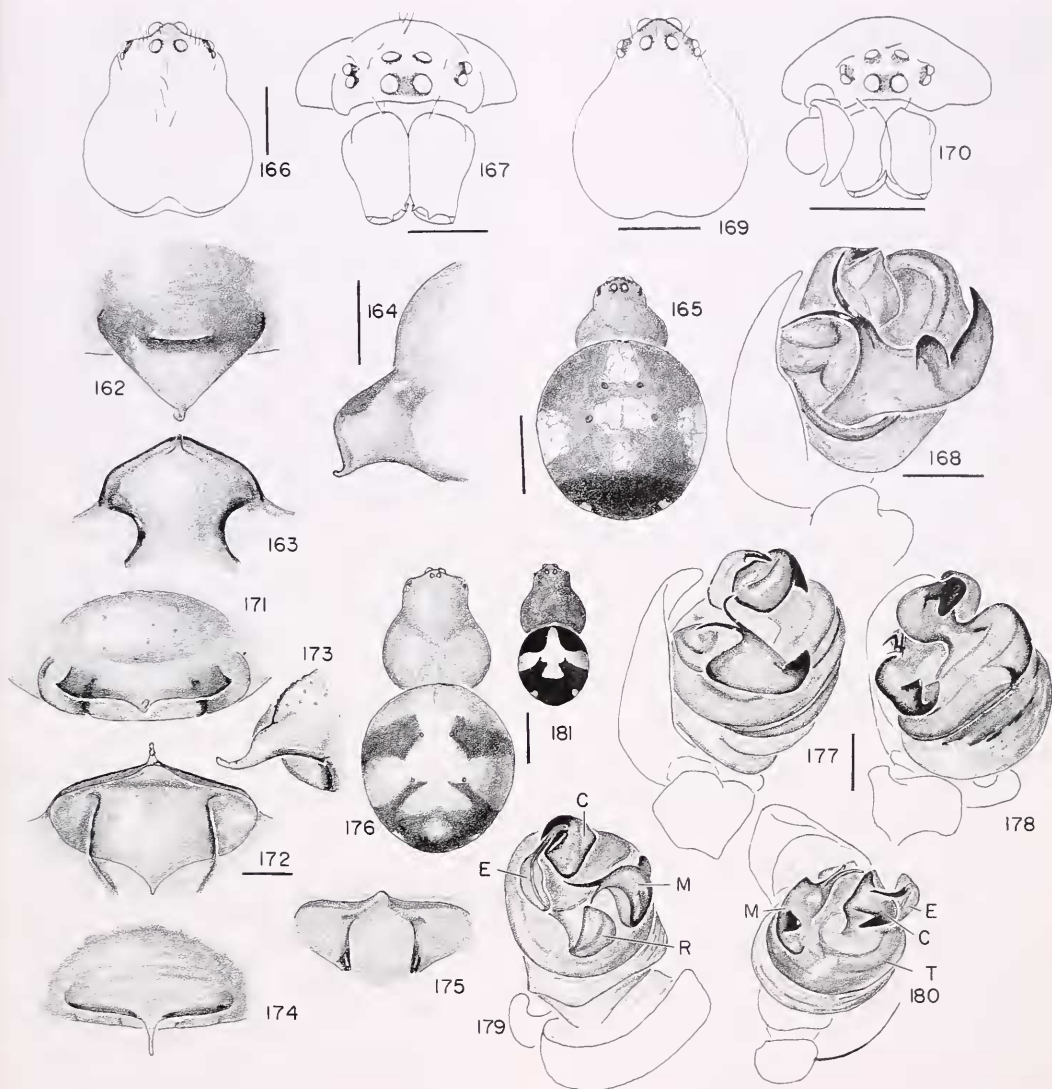
Male paratype. Color as in female except lacking anterior abdominal white pigment patches, having only the posterior pair. Posterior median eyes 0.8 diameter of anterior medians, laterals 0.6 diameter. Anterior median eyes 0.7 diameter apart, 0.7 diameter from laterals. Posterior median eyes 0.8 diameter apart, 1.2 diameters from laterals. Endite with small tooth. Total length 1.8 mm. Carapace 1.07 mm long, 0.88 wide, 0.44 behind lateral eyes. First femur 0.91 mm, patella and tibia 0.81, metatarsus 0.49, tarsus 0.40. Second patella and tibia 0.72 mm, third 0.45, fourth 0.65.

Note. Males and females were collected together; both have the posterior of the abdomen black.

Variation. Total length of females 2.4 to 3.5 mm, males 1.8 to 2.1. The anterior, median, transverse groove of the epigynum (center of Fig. 162) may be absent or different in width from that illustrated. Illustrations were made from specimens collected 80 km north of Manaus.

Diagnosis. *Micrepeira fowleri*, unlike other species, has its abdomen black posteriorly, contrasting with the lighter anterior three-quarters (Fig. 165). Females are smaller than *M. hoeferi* and are separated from them by having a large triangular lobe of the epigynum with a central transverse groove or dark mark between two darker areas (Fig. 162) and by having concave sides of the posterior median plate (Fig. 163). The male differs from that of *M. hoeferi* by having a lobe in the middle of the median apophysis (Fig. 168). It is possible that all specimens considered *M. fowleri* are variants of *M. tubulofaciens*.

Natural History. Specimens of *M. fowleri* were collected in forest border and



Figures 162–170. *Micrepeira fowleri* n. sp. 162–167, female. 162–164, epigynum. 162, ventral. 163, posterior. 164, lateral. 165, dorsal. 166, carapace. 167, eye region and chelicerae. 168–170, male. 168, left palpus. 169, carapace. 170, eye region, chelicerae, and right palpus.

Figures 171–181. *Micrepeira hoeferi* n. sp. 171–176, female. 171–175, epigynum. 171, 174, ventral. 172, 175, posterior. 173, lateral. 171–173, (Mato Grosso State). 174, 175, (Amazonas State). 176, dorsal. 177–181, male. 177–180, left palpus. 177, mesal. 178, ventral. 179, 180 pulled apart. 181, dorsal.

Abbreviations. C, conductor. E, embolus. M, median apophysis. R, radix. T, tegulum.

Scale lines. 1.0 mm, genitalia 0.1 mm, except Figures 166, 167, 169, 170, 0.5 mm.

forest interior. The retreat has parallel sides, about 4.0 to 4.5 mm wide and 10 to 20 mm long.

Distribution. Amazonian Ecuador, Peru to Manaus Brazil (Map 6).

Paratypes. BRAZIL *Amazonas*: Km 41 Reserve, 25 May 1991, 1♀ (H. G. Fowler, E. Venticinque, R. S. Vieira).

Specimens Examined. ECUADOR *Sucumbíos*: Cuyabeno Reserve, Laguna Grande, 13 Feb. 1984, 1♀ (L. Avilés, MECN). PERU *Madre de Dios*: Zona Reservada Tambopata, 290 m, 12°50'S, 69°17'W, 14 June 1988, 1♀ (D. Silva D., MUSM). BRAZIL *Amazonas*: 80 km N Manaus, 2°24'S, 59°52'W, 26 Feb. 1989, ♂, 9 Nov. 1989, 1♂ (H. G. Fowler, MCZ); Cabo Frio Reserve, 80 km N Manaus, 1989, 1990, 5♀, 2♂; Colosso Reserve, 80 km N Manaus, 1989, 1990, 101♀, 16♂ (H. G. Fowler, E. Venticinque, R. S. Vieira, MCZ); Dimona Reserve, 1989–1992, 5♀, 1♂ (H. G. Fowler, MCZ); Reserva Porto Alegre, 80 km N Manaus, 1989–1992, 2♀ (H. G. Fowler, MCZ); Reservacida de Powel, 20 Apr. 1991, 1♀ (H. G. Fowler, MCZ); Reserva Ducke, 4 Oct. 1990, 1♀ (H. Höfer, INPA).

Micrepeira hoeferi new species

Plate 4; Figures 171–181; Map 6

Holotype. Female holotype from igapó Tarumã Mirim, near Manaus, Amazonas State, Brazil, 11 Feb. 1988 (H. Höfer), in INPA. The species is named after H. Höfer, who collected it and photographed its web.

Spilasma tubulofaciens:—Quintero, 1974: 307, figs. 1–6, ♀, web.

Description. Female holotype. Carapace dusky orange, sides of thorax darkest. Chelicerae light brown. Labium, endites, sternum dark orange-brown. Coxae, legs brown with indistinct darker rings. Dorsum of abdomen with single and paired white patches on black (Fig. 176); sides, venter black. Posterior median eyes 1 diameter of anterior medians, laterals 0.8 diameter. Anterior median eyes 0.8 diameter apart, 2.2 diameters from laterals. Posterior median eyes 1 diameter apart, 3 diameters from laterals. Total length 5.0 mm. Carapace 2.5 mm long, 2.1 wide, 1.5 behind lateral eyes. First femur 1.8 mm, patella and tibia 1.8, metatarsus 1.1, tarsus 0.8. Second patella and tibia 1.7 mm, third 1.3, fourth 1.5.

Male from Mato Grosso. Color darker than female. Carapace, sternum brownish black. Only proximal portion of femur, metatarsi, and tarsi light; others contrastingly ringed. Dorsum of abdomen with white cross and a pair of white posterior spots (Fig. 181), venter with white band around anterior above carapace. Posterior median eyes 0.8 diameter of anterior medians, laterals 0.7 diameter. Anterior median eyes 0.8 diameter apart, 1.5 diameters from laterals. Posterior median eyes their diameter apart, 2.1 diameters from laterals. Total length 2.4 mm. Carapace 1.3 mm long, 1.3 wide, 0.7 behind lateral eyes. First femur 1.2 mm, patella and tibia 1.2, metatarsus 0.7, tarsus 0.6. Second patella and tibia 1.1 mm, third 0.7, fourth 0.9.

Note. Males and females have been collected together; they have a similar color pattern on the abdomen (Figs. 176, 181).

Variation. Total length of females 5.0 to 6.3 mm, males 1.5 to 2.4. Figures 171–173 and 176–181 were made from specimens from Mato Grosso and Figures 174 and 175 from the female holotype.

Diagnosis. Females are larger than those of *M. tubulofaciens*, and the epigynum, in ventral view, has a straight posterior border (Figs. 171, 174). In both *M. fowleri* and *M. tubulofaciens*, the epigynum has a triangular median lobe in ventral view (Figs. 162, 182).

Natural History. With the type specimen is a note saying that it came from a vertical web, the orb truncate above, with a cone-shaped retreat with cover; web diameter 20 cm, built about 1.5 m above ground, mesh width 2 to 3 mm (Pl. 4). The retreat is made of silk and detritus particles and is about 8 mm wide and 13 mm long. Another measured 7 by 30 mm. Two specimens collected by R. L. C. Baptista were 1.8 and 2.0 m above ground, in forest. The female from French Guiana was collected with the female of *M. tubulofaciens* in forest clearing.

Distribution. French Guiana to Peru, to Mato Grosso, Brazil (Map 6). It may occur in Paraguay, on the basis of a dia-

gram of a web, sent by J. Kochalka, with an inquiry about the genus of the builder.

Specimens Examined. FRENCH GUIANA Crique Limonade, 3–4 km SW Saül, 21–22 Dec. 1972, 1♀ (D. Quintero, MCZ); Montagnes Kaw nr. Camp Calman, 27 km SE Roura, 4°33'N, 52°09'W, 25 Aug. 1988, ♀ (S. Marshall, USNM). PERU *Madre de Dios*: Zona Reservada Tambopata, 290 m, 12°50'S, 69°17'W, 4 June 1988, 1♀ (J. Coddington, USNM). BRAZIL *Roraima*: Ilha de Maracá, 20 July 1987, 2♀ (A. A. Lise, MCN 20065); 1♀ (F. P. Benton, MCN 20066). *Amazonas*: Parq. Nacion. Pico da Neblina, Maturacá, 11 Oct. 1990, 1♀ (A. A. Lise, MCP); Colosso Reserve, 80 km N Manaus, 18 Jan. 1989, 2♀ (H. G. Fowler, MCZ); 2 March 1990, 1♀ (H. G. Fowler, R. S. Vieira, E. Venticinque, MCZ); 80 km N Manaus, 17 Jan. 1989, 1♀ (H. Fowler, MCZ); Reserva Campina, Manaus, 22 Jan. 1973, 1♂ (L. P. Albuquerque, MCN 21179); Reserva Ducke, Manaus, 4 Aug. 1987, 1♀ (A. A. Lise, MCN 23357); 15 Aug. 1991, 2♀ (A. D. Brescovit, MCN 21392). *Pernambuco*: Dois Irmãos Forest Reserve, 25 Jan. 1989, 1♀ (R. L. C. Baptista, A. P. Chaves, RLCB). *Mato Grosso*: Chapada dos Guimarães, 15–26 July 1992, 4♀, 2♂, 2 imm. (A. A. Lise, A. Braul, MCP, 2358, 2361); Chavantina, 22 Jan. 1947, 1♀, doubtful det. (H. Sick, MZSP). *Espírito Santo*: Dois Bocas Forest Reservation, 15 Nov. 1988, 2♀ (R. L. C. Baptista, A. P. Chaves, RLCB).

Micrepeira tubulofaciens (Hingston) new combination

Figures 182–186; Map 6

Epeira tubulofaciens Hingston, 1932: 366, figs. 40, 41 (webs). Female holotype from Moraballi Creek, 2 mi [3.2 km] east of Essequibo River, 12 mi [38.5 km] south of Bartica, Guyana, in BMNH, lost.
Aranea tubulifaciens:—Roewer, 1942: 854.
Epeirella tubulofaciens:—Mello-Leitão, 1948: 164.
Araneus tubulifaciens:—Bonnet, 1955: 620.

Note. Hingston's illustrations (1932, figs. 40, 41) of *Epeira tubulofaciens* match the web of *M. hoeferi* (Pl. 4). Hingston described this species as having "colour black with a white area in front where base overhangs cephalothorax and a broad white T-shaped mark on the dorsum, the horizontal limb of the T crossing the mid-dorsum transversely and the vertical limb running forward to the center of the base." This description may fit all *Micrepeira* species; however, this is the species found in Guyana (although others may occur there), and Hingston gives the size of 3.1

mm, while the similar, widespread *M. hoeferi* is about 5 mm total length.

A female was examined, which was cited by Mello-Leitão (1948), and is deposited in the BMNH.

I am not following Bonnet (1955) and Roewer (1942) in changing the spelling of "*tubulofaciens*", because Hingston was consistent in spelling the name with an "o".

Description. Female from French Guiana. Cephalothorax light orange, legs slightly dusky, distal ends darkest. Dorsum of abdomen black with gray and white pigment patches (Fig. 185); venter with black band from genital groove to spinnerets and around spinnerets; sides dusky orange. Posterior median eyes same diameter as anterior medians, laterals 0.9 diameter. Anterior median eyes 0.5 diameter apart, 1 diameter from laterals. Posterior median eyes 0.5 diameter apart, 1.1 diameters from laterals. Total length 3.1 mm. Carapace 1.3 mm long, 1.3 wide, 0.7 behind lateral eyes. First femur 1.2 mm, patella and tibia 1.2, metatarsus 0.7, tarsus 0.5. Second patella and tibia 1.1 mm, third 0.6, fourth 1.1.

Variation. Total length of females 3.1 to 3.6 mm. The illustrations were made from a female from French Guiana.

Diagnosis. This species is smaller than *M. hoeferi*, and its epigynum is a large triangle with distinct markings (Fig. 182). It differs from *M. fowleri* by having the black cap on the posterior of the abdomen less distinct (Fig. 185).

Natural History. A retreat measured 5.4 mm wide and 13 mm long. Judging by Hingston's illustrations, the web is similar to that of *M. hoeferi* (Pl. 1). The specimen from French Guiana came with a female of the larger *M. hoeferi* and was collected in forest clearing; the specimen from Canje Ikuruwa River came from forest savanna.

Distribution. Guianas (Map 6).

Specimens Examined. GUYANA Canje Ikuruwa River, 05°30'N, 57°30'W, Aug.–Dec. 1961, 1♀ (G. Bentley, AMNH); Higher Potaro River Distr. 1♀ (R.

Lloyd, BMNH); Kartabo, 1924, 1♀ (AMNH). FRENCH GUIANA Crique Limonade, 3–4 km SW Saül, 21, 22 Dec. 1972, ♀ (D. Quintero, MCZ); Montagnes Kaw, nr. Camp Calman, ca. 27 km SE Roura, 4°33'N, 52°09'W, 5, 7 Aug. 1988, 2♀ (S. Marshall, USNM).

Micrepeira pachitea new species

Figures 187–191; Map 6

Holotype. Female holotype from Panguana, Río Pachitea, Depto. Huánuco, Peru, 9°37'S, 74°56'W, 1987 (C. Manhart), in MCZ. The specific name is a noun in apposition after the locality.

Description. Female holotype. Carapace orange-brown. Chelicerae, labium, endites, sternum brown. Legs brown. Dorsum of abdomen black with white patches (Fig. 190); venter black with a white transverse band anterior of pedicel. Posterior median eyes 0.8 diameter of anterior medians, anterior laterals 0.8 diameter, posterior 1 diameter. Anterior median eyes 0.7 diameter apart, 2 diameters from laterals. Posterior median eyes 0.8 diameter apart, 2.4 diameters from laterals. Total length 4.8 mm. Carapace 2.3 mm long, 1.9 wide, 1.3 behind lateral eyes. First femur 2.0 mm, patella and tibia 1.9, metatarsus 1.0, tarsus 0.8. Second patella and tibia 1.8 mm, third 1.3, fourth 1.6.

Variation. Total length of females 4.8 to 5.6 mm.

Diagnosis. The sternum of *M. pachitea* has an anterior median groove (Fig. 191) and the epigynum is a broad, wide triangle (Fig. 187).

Natural History. The cone-shaped retreat, preserved with the specimen, is about 7 mm wide and 21 mm long, another is 13 mm long.

Distribution. Peruvian Amazon (Map 6).

Specimens Examined. PERU Loreto: Génaro Herrera, 04°55'S, 73°45'W, 28 Aug. 1988, 3♀ (D. Silva D., MUSM). Madre de Dios: Zona Reservada Tambopata, 290 m, 14 June 1988, 1♀ (D. Silva D., MUSM).

Micrepeira smithae new species

Figures 192–195; Map 6

Holotype. Female holotype from Voltzberg-Raleighvallen Reserve, 4°45'N, 56°10'W, Surinam,

April, May 1984 (D. Smith Trail), in MCZ. The species is named after the collector, arachnologist D. Smith.

Description. Female holotype. Carapace dark brown. Chelicerae, labium, endites, sternum, dark brown. Legs brown. Dorsum of abdomen black with white chevrons (Fig. 195); venter black, with paired anterior white spots, one lying above each third femur when the spider is in resting position. Posterior median eyes same diameter as anterior medians, anterior laterals 0.8 diameter, posterior laterals 1 diameter. Anterior median eyes their diameter apart, 2 diameters from laterals. Posterior median eyes 0.8 diameter apart, 2.2 wide diameters from laterals. Total length 3.5 mm. Carapace 1.8 mm long, 1.7 wide, 1.1 behind lateral eyes. First femur 1.4 mm, patella and tibia 1.3, metatarsus 0.7, tarsus 0.6. Second patella and tibia 1.3 mm, third 0.9, fourth 1.2.

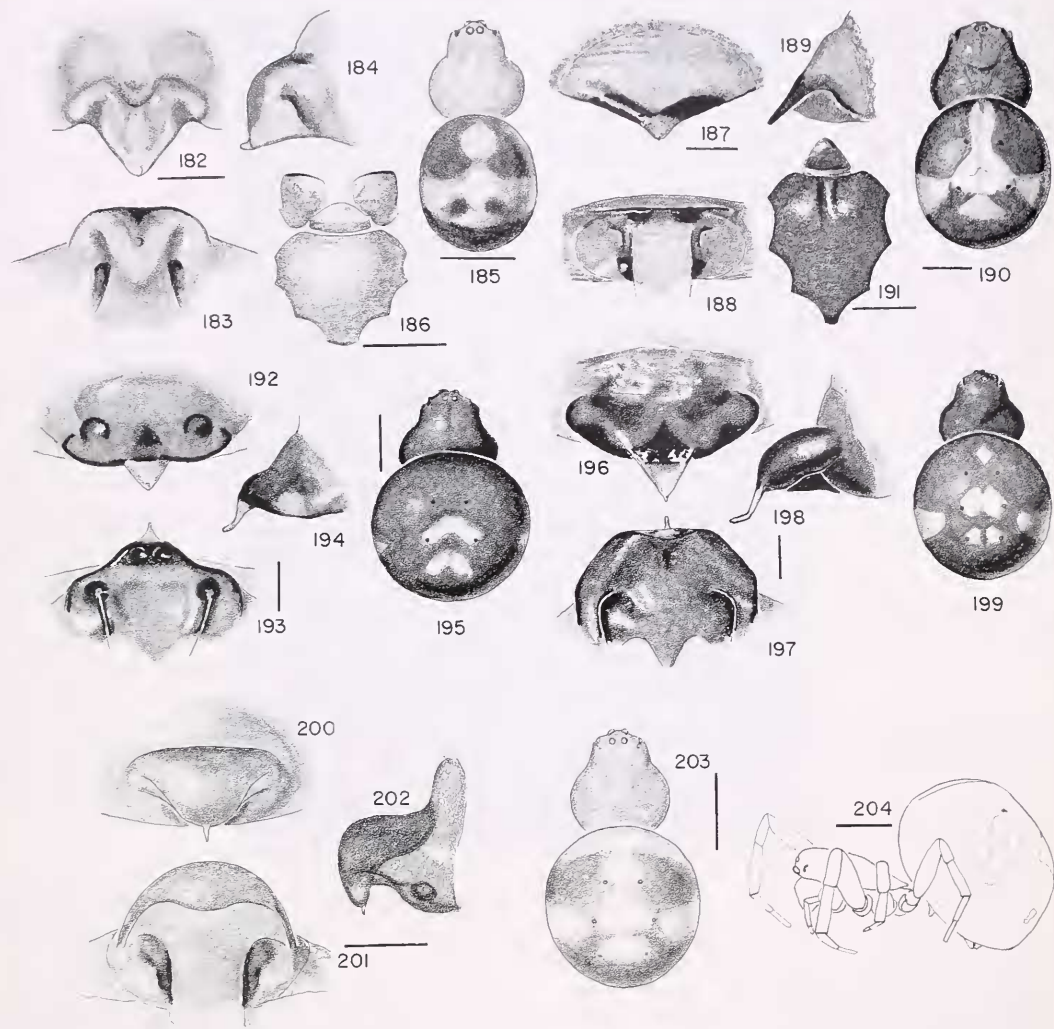
Diagnosis. The epigynum of *M. smithae* differs from others by having a small triangle at the posterior margin, tapering into a tiny scale (Fig. 192), and by having a wide depressed median plate in posterior view (Fig. 193).

Micrepeira velso new species

Figures 196–199; Map 6

Holotype. Female holotype and immature paratype from Finca La Selva, near Puerto Viejo, Heredia, Costa Rica, Jan. 1978 (W. Eberhard no. 1280), in MCZ. The specific name is an arbitrary combination of letters.

Description. Female holotype. Carapace dark orange-brown. Chelicerae orange-brown. Labium, endites, sternum orange-brown. Legs brown. Dorsum of abdomen black with white patches (Fig. 199); venter black with paired anterior white patches lying above fourth coxae. Eyes subequal in size. Anterior median eyes 0.8 diameter apart, 2.5 diameters from laterals. Posterior median eyes their diameter apart, 2.7 diameters from laterals. Total length 4.7 mm. Carapace 2.1 mm long, 2.0 wide, 1.1 behind lateral eyes. First femur



Figures 182-186. *Micropeira tubulofaciens* (Hingston), female. 182-184, epigynum. 182, ventral. 183, posterior. 184, lateral. 185, dorsal. 186, sternum.

Figures 187-191. *M. pachitea* n. sp., female. 187-189, epigynum. 187, ventral. 188, posterior. 189, lateral. 190, dorsal. 191, sternum.

Figures 192-195. *M. smithae* n. sp., female. 192-194, epigynum. 192, ventral. 193, posterior. 194, lateral. 195, dorsal.

Figures 196-199. *M. velso* n. sp., female. 196-198, epigynum. 196, ventral. 197, posterior. 198, lateral. 199, dorsal.

Figures 200-204. *M. albomaculata* Schenkel, female. 200-202, epigynum. 200, ventral. 201, posterior. 202, lateral. 203, dorsal. 204, lateral.

Scale lines. 1.0 mm, genitalia 0.1 mm, except Figures 186, 191, 0.5 mm.

1.8 mm, patella and tibia 1.7, metatarsus 0.9, tarsus 0.7. Second patella and tibia 1.6 mm, third 1.2, fourth 1.4.

Diagnosis. This species differs by the triangular median piece of the epigynum overhanging the posterior margin (Fig. 196) and by the raised median posterior plate that overhangs the lateral plates (Fig. 197).

Natural History. The web was at the edge of a clearing and was tattered in the evening, fresh in the morning, suggesting that the spider builds early in the morning. The spider was in a retreat and pulled the sides of the retreat together when disturbed. The web was 28 cm wide (Eberhard, personal communication and photographs); the retreat, collected with the specimen, was 6 mm wide and 11 mm long.

Paratype. COSTA RICA *Heredia*: Sarapiquí nr. Puerto Viejo, Sept. 1981, 1♀ (C. E. Griswold, CAS).

Micrepeira albomaculata Schenkel Figures 200–204; Map 6

Micrepeira albomaculata Schenkel, 1953: 26, fig. 24, ♀. Female holotype from El Pozón, Depto. Acosta, Est. Falcón, Venezuela, in NMB, examined. Brignoli, 1983: 276.

Description. Female holotype. Carapace dark orange, sides of thoracic region dusky. Chelicerae, labium, endites, sternum orange. Legs dark orange. Dorsum of abdomen black with median and paired white patches (Figs. 203, 204); venter dusky, without white pigment. Chelicerae with two teeth on anterior margin. Eyes subequal. Anterior median eyes 0.8 diameter apart, 1.5 diameters from laterals. Posterior median eyes their diameter apart, 1.5 diameters from laterals. Total length 3.5 mm. Carapace 1.43 mm long, 1.31 mm wide. First femur 1.01 mm, patella and tibia 1.03, metatarsus 0.57, tarsus 0.52. Second patella and tibia 1.04 mm, third 0.68, fourth 0.96.

Diagnosis. The bulbous median lobe of

the epigynum (Fig. 200) and the T-shaped posterior median plate (Fig. 201) separate this species from all other known *Micrepeira* species.

Madrepeira new genus

Type species. *Madrepeira amazonica*. The name is an arbitrary combination of letters prefixed to "epeira". The name is feminine.

Diagnosis. The genus is close to *Aculepeira*, *Amazonpeira*, *Metepeira*, *Kaira*, and *Tatepeira*, all of which exhibit two known synapomorphies: the pointed scape of the epigynum and the pair of flagella on the median apophysis (M in Fig. 213) of the male palpus. *Madrepeira* differs by the shape of the epigynum, which has lateral and median plates fused into a base and, on each side of the attachment of the scape, a scale formed from the posterior median plate (Figs. 205–208). It also differs from other genera by the diamond-shaped abdomen with paired lateral humps and by having spindly legs with only a few long setae (Fig. 209). The genus also differs in making a ladderweb (Pl. 5), similar to that of *Scoloderus*.

Relationship. Characters that ally this genus to *Araneus* include placement of the conductor (C in Fig. 213), covering the tegulum at the upper right (in the left palpus, at 2–3 hr in Fig. 212), the presence of distal hematodocha (DH) between the embolus (E) and the terminal apophysis (A in Fig. 213), the median apophysis with a distal spine and a proximal pair of flagella (M in Fig. 213), and two palpal patellar macrosetae (at 10 hr in Fig. 216) (the last character sometimes missing in a few species belonging to this group). The female has an annulate scape as do most relatives of *Araneus* (but also *Parawixia* and *Eriophora*, both *Alpaida* relatives).

Natural History. *Madrepeira* makes a short ladderweb in forests (Pl. 5).

Distribution. There is only one Neotropical species.



Plate 5. *Madrepeira amazonica* n. sp. Web of an immature, about 5.1 cm wide, 16.5 cm long, calculated from the size of the spider (photo, J. Coddington).

Madrepeira amazonica new species
Plate 5; Figures 205–216; Map 7

Holotype. Male holotype from Albergue "Cuzco Amazonica," 200 m, 12°33'S, 69°03'W, Río Madre de Dios, Depto. Madre de Dios, Peru, 9 Mar. 1990 (D. Silva D.), in MUSM. The specific name is a noun in apposition after the type locality.

Description. Female paratype. Carapace yellowish white with pink on each side of cephalic region. Chelicerae, labium, endites, sternum, legs yellowish white. Dorsum of abdomen with black dots, except for two light patches, one on each side (Fig. 209). Centers of light patches with some pink dots. Sides with a black

line bordering the dorsal black spots and the white side of venter; venter yellowish with white on each side. Posterior median eyes 0.5 diameter of anterior medians, anterior laterals 0.6 diameter, posterior laterals 0.5 diameter. Anterior median eyes their diameter apart, their diameter from laterals. Posterior median eyes 1.5 diameters apart, 2.2 diameters from laterals. Ocular quadrangle narrower behind than in front. Height of clypeus equals 0.4 diameter of anterior median eye. One chelicera with five teeth on anterior margin, other with four teeth; four teeth on one posterior margin, three on other; denticles

Map 7. Distribution of *Madrepeira amazonica*.

in grooves. Legs spindly with short, fine setae and a few very long, dark macrosetae (Fig. 214). Abdomen diamond-shaped (Fig. 209). Total length 5.0 mm. Carapace 2.1 mm long, 1.7 wide, 1.0 behind lateral eyes. First femur 3.7 mm, patella and tibia 4.2, metatarsus 3.6, tarsus 1.5. Second patella and tibia 3.4 mm, third 1.7, fourth 2.5.

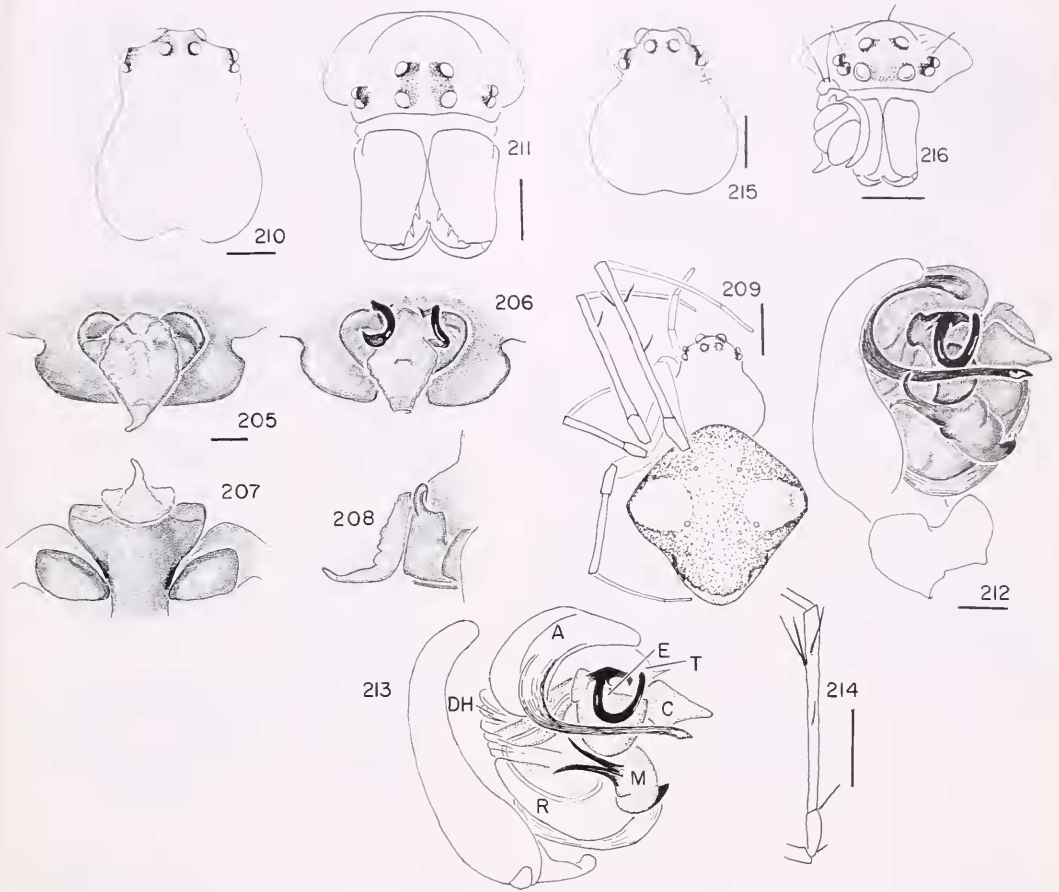
Male holotype. Color as in female. Posterior median eyes 0.5 diameter of anterior medians, anterior laterals 0.5 diameter, posterior laterals 0.4 diameter. Anterior median eyes their diameter apart, 0.3 diameter from laterals. Posterior median eyes their diameter apart, 1.5 diameters from laterals. Ocular quadrangle narrower behind than in front. Height of clypeus equals 0.2 diameter of anterior median eye. Endite with cone-shaped tooth facing a tubercle on palpal femur. Palpal patella with two macrosetae (Fig. 216). First coxa with a minute hook on distal margin. First tibia with a pair of macrosetae on a slight tubercle (Fig. 214). Second tibia as thick as first, not modified. Abdomen diamond-shaped. Total length 3.0 mm. Carapace 1.43 mm long, 1.30 wide, 0.68 behind lateral eyes. First femur 2.92 mm, patella and

tibia 3.32, metatarsus 2.62, tarsus 1.17. Second patella and tibia 2.56 mm, third 1.17, fourth 1.87.

Note. Males and females were matched because they have similar markings and abdomen shape and were collected together. The black horseshoe-shaped appendage of the embolus (Figs. 212, 213) breaks off and stays attached to the epigynum (Fig. 206), perhaps blocking insemination by other males.

Variation. Total length of females 4.7 to 5.8 mm, males 3.0 to 3.5. Illustrations were made from a female paratype and male holotype, except for Figures 210, 211, 215, and 216, which were made from Bolivian specimens. One immature specimen had four white patches across the abdomen, one anterior median patch, and five confluent posterior patches each with a pink center and white outside. Some individuals have black rings on the patella. Others had a red line around the white patches on the abdomen. Eyes of Bolivian specimens are slightly farther apart than those from Peru.

Natural History. Most specimens were obtained by night collecting. Bolivian



Figures 205–216. *Madrepeira amazonica* n. sp. 205–211, female. 205–208, epigynum. 205, ventral. 206, ventral, mated. 207, posterior. 208, lateral. 209, dorsal. 210, carapace. 211, eye region and chelicerae. 212–216, male. 212, 213, left palp. 212, mesal. 213, pulled apart. 214, first left patella and tibia, prolateral. 215, carapace. 216, eye region, chelicerae, and right palp.

Abbreviations. A, terminal apophysis. C, conductor. DH, distal hematodocha. E, embolus. M, median apophysis. R, radix. T, tegulum.

Scale lines. 1.0 mm, genitalia 0.1 mm, except Figures 210, 211, 215, 216, 0.5 mm.

specimens were observed in a ladderweb (Pl. 5).

Distribution. Amazon region to southern Mato Grosso, southern Bahia States, Brazil (Map 7).

Paratypes. PERU *Madre de Dios*: Albergue “Cuzco Amaconica”, 200 m, Rio Madre de Dios, 16 May–12 June 1989, 4♀, 1♂ (D. Silva D., MUSM, 1♀ in MCZ).

Specimens Examined. PERU *Madre de Dios*: Zona Reservada Tambopata, 30 km SW Puerto Maldonado, 6–14 Sept. 1984, 1♂ (T. L. Erwin et al., USNM). BRA-

ZIL *Roraima*: Ilha de Maracá, Rio Uraricoera, 25 Mar. 1987, 1♀ (A. A. Lise, MCN 20070). *Amazonas*: Lago de José, Manaus, 9 Aug. 1987, 1♀ (J. Adis, MCN 20071); Rio Tarumã, Mirim, Manaus, 30 July 1979, 1 imm. (J. Adis et al., MCN 20054). *Bahia*: Fazenda Nossa Senhora das Neves, Itamarajú, 9 Oct. 1978, 1♂ (J. S. Santos, MCN 11089); Fazenda Matiapã, Camacan, 16 Oct. 1978, 1♀ (J. S. Santos, MCN 11113). *Mato Grosso*: Poconé, Fazenda Santa Inês, Pantanal, 5–11 Aug. 1992, 3 imm, 1♂ (A. A. Lise, A. Brault, MCP 2362). *BOLIVIA Beni*: Station Biologica Beni, on trail betw. Zones 1 & 2, 12 Sept. 1987, 1♀ (J. Coddington, USNM).

Tatepeira new genus

Type species. *Aranea tatarendensis* Tullgren, 1905.

The name is an arbitrary combination of letters, prefixed to "epeira"; its gender is feminine.

Diagnosis. *Tatepeira* is close to *Aculepeira*, *Amazonpeira*, *Madrepeira*, *Metepeira*, and *Kaira*, all of which have a pointed scape on the epigynum (Figs. 217–219) and, in the male, a pair of flagella on the median apophysis (M in Fig. 224). *Tatepeira* differs from these genera by having a pair of large dorsal humps on the abdomen (Figs. 220, 227, 234, 238). (*Aculepeira visite* Levi, 1991a, does have humps on the abdomen and may belong here.) The type species *T. tatarendensis* has the scape of the epigynum on a pedestal (Figs. 217–219), making the epigynum longer than wide as seen from the side (Fig. 219).

Note. Three of the four species are placed here tentatively: *Tatepeira itu* lacks a terminal apophysis and the distal hematodocha in the palpus (Figs. 229, 230). *Tatepeira stadelmani* and *T. carrolli* are similar to each other, but until their males are known their generic placement is uncertain. Before I revised *Kaira* (Levi, 1993c), I considered these two to belong to *Kaira*, but the distal articles of the legs are not as curved and spinose as in species of *Kaira*.

Relationship. The pointed scape of the epigynum (Figs. 217, 225) and the two flagella on the median apophysis (M in Fig. 224) relate *Tatepeira* to *Aculepeira*, *Amazonpeira*, *Madrepeira*, *Metepeira*, and *Kaira*. These genera, as others related to *Araneus* and *Neoscona*, has the palpus with distal hematodocha (DH in Fig. 224), the conductor is near the edge of the tegulum below the arrow-shaped tip of the terminal apophysis (Fig. 223, C in Fig. 224), and there are two setae on the palpal patella.

Natural History. The web is not known for any of the species.

Distribution. All four species are Neotropical.

KEY TO SPECIES HERE PLACED IN *TATEPEIRA*

The males of *T. stadelmani* and *T. carrolli* are not known.

1. Female 3
- Male 2
- 2(1). Palpal flagella attached to distal end of median apophysis of palpus and median apophysis without row of teeth (Figs. 222, 223, M in Fig. 224); widespread (Map 8) *tatarendensis*
- Flagella on proximal end of median apophysis, distal end with teeth (Figs. 229, 230); southern Brazil (Map 8) *itu*
- 3(1). Scape of epigynum on a pedestal (Figs. 217–219); widespread (Map 8) *tatarendensis*
- Epigynum flat (Figs. 225, 226, 231–233, 235–237) 4
- 4(3). Abdomen humps facing dorsally (Fig. 227); total length less than 4 mm; southern Brazil (Map 8) *itu*
- Large humps facing laterally (Figs. 234, 238); total length more than 5 mm 5
- 5(4). In posterior view of epigynum, only lateral plates sclerotized and lateral plates with a ventral concave notch (Fig. 232); Honduras (Map 8) *stadelmani*
- In posterior view of epigynum, median plates sclerotized and ventrally curled (Fig. 236); Colombia (Map 8) *carrolli*

Tatepeira tatarendensis (Tullgren)
new combination

Figures 217–224; Map 8

Aranea tatarendensis Tullgren, 1905: 34, pl. 5, fig. 12, ♀. Female holotype from Tatarenda [Depto. Tarija, 600 m, northeast of Aguiarenda, 21°50'S, 63°37'W, on border between tropical forest and dry woods (Paynter, 1993)], Bolivia, in NRMS, examined. Roewer, 1942: 853.

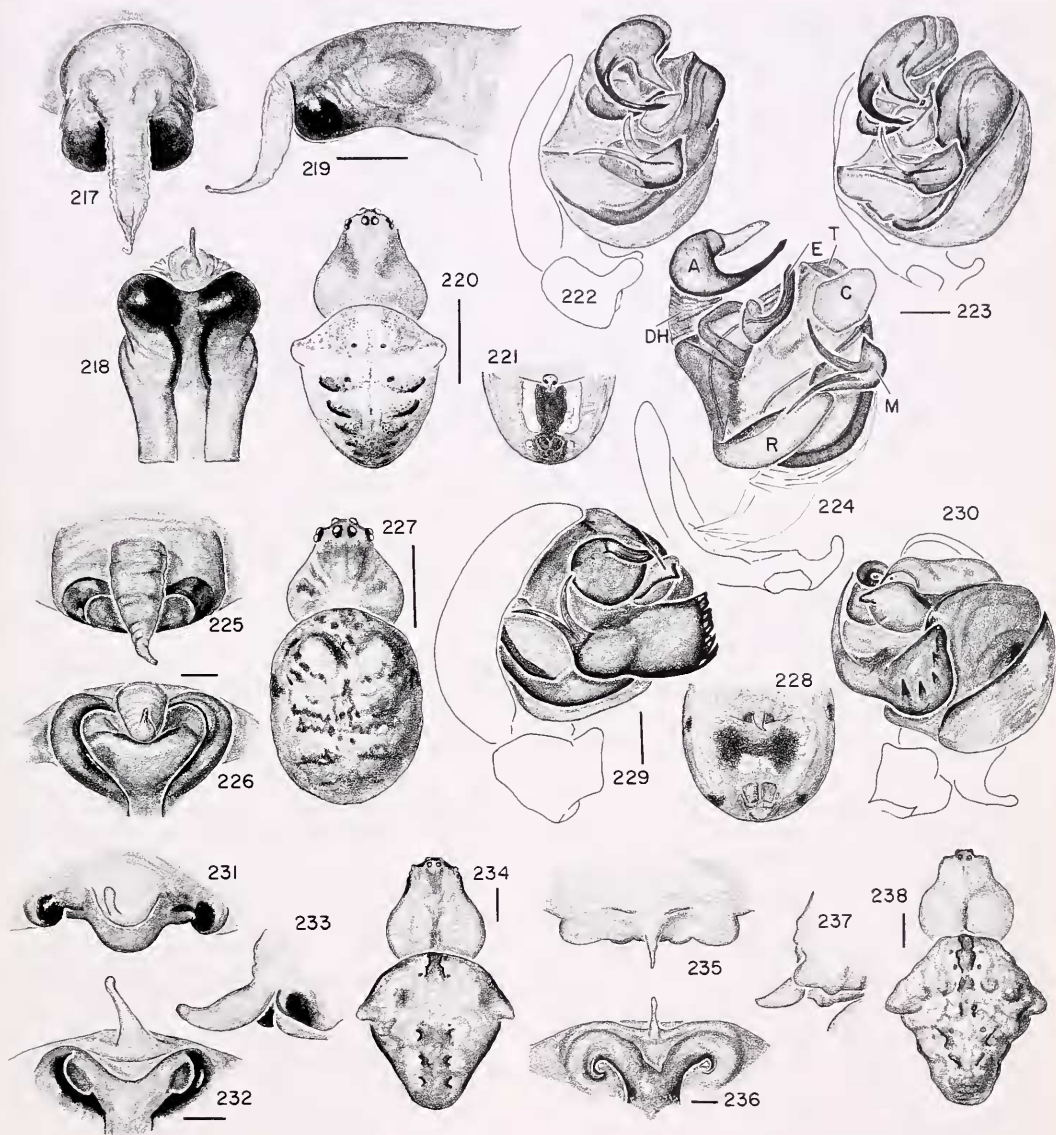
Araneus holmi Caporiacco, 1955: 354, fig. 34, ♀. Female holotype from Maiquetía, Distr. Federal, Venezuela, in UCVC. NEW SYNONYMY.

Araneus tatarendensis:—Bonnet, 1955: 609.

Araneus akeholmi Brignoli, 1983: 252. New name for *A. holmi*, preoccupied. NEW SYNONYMY.

Wixia tatarendensis:—Levi, 1991b: 177.

Description. Female from northern Colombia. Carapace yellowish white, dusky on each side of head, and carapace underlain by a white pigment patch. Carapace lightly sclerotized, without setae, not shiny. Chelicerae orange. Labium, endites dusky. Sternum black, lightest in center. Coxae yellowish white; legs yellowish.



Figures 217–224. *Tatepeira tatarendensis* (Tullgren). 217–221, female. 217–219, epigynum. 217, ventral. 218, posterior. 219, lateral. 220, dorsal. 221, abdomen, ventral. 222–224, left male palpus. 222, mesal. 223, ventral. 224, pulled apart.

Figures 225–230. *T. itu* n. sp. 225–228, female. 225–226, epigynum. 225, ventral. 226, posterior. 227, dorsal. 228, abdomen, ventral. 229, 230, palpus. 229, mesal. 230, ventral.

Figures 231–234. *T. stadelmani* n. sp., female. 231–233, epigynum. 231, ventral. 232, posterior. 233, lateral. 234, dorsal.

Figures 235–238. *T. carrolli* n. sp., female. 235–237, epigynum. 235, ventral. 236, posterior. 237, lateral. 238, dorsal.

Abbreviations. A, terminal apophysis. C, conductor. DH, distal hematodocha. E, embolus. M, median apophysis. R, radix. T, tegulum.

Scale lines. 1.0 mm, genitalia 0.1 mm.



Map 8. Distribution of *Tatepeira* species.

Dorsum of abdomen white with pairs of curved black lines approaching each other posteriorly, and dusky spotted areas (Fig. 220); venter black between epigynum and spinnerets with a wide, white, longitudinal streak on each side and a white spot on each side of black spinnerets (Fig. 221). Posterior median eyes 1.3 diameters of anterior medians, laterals same diameter as anterior medians. Anterior median eyes 1 diameter apart, 1.5 diameters from laterals. Posterior median eyes 0.8 diameter apart, 2.2 diameters from laterals. Ocular quadrangle square. Height of clypeus equals 0.5 diameter of anterior median eye. Abdomen slightly longer than wide with anterolateral humps (Fig. 220). Total length 2.9 mm. Carapace 1.6 mm long, 1.2 mm wide, 0.7 behind lateral eyes. First femur 1.5 mm, patella and tibia 1.8, metatarsus 1.3, tarsus 0.6. Second patella and tibia 1.7 mm, third 0.9, fourth 1.5.

Male from northern Colombia. Color as

in female. Carapace with longitudinal median line in thoracic region. Posterior median eyes same diameter as anterior medians, laterals 0.8 diameter. Anterior median eyes their diameter apart, 1.5 diameters from laterals. Posterior median eyes 0.8 diameter apart, 2 diameters from laterals. Ocular quadrangle narrower behind than in front. Height of clypeus equals 0.8 diameter of anterior median eye. Endite with tooth, palpal femur with facing tubercle. Palpal patella with two macrosetae. First coxa with large hook. Second tibia thicker than first, swollen, and with prolateral macrosetae. Abdomen oval without humps. Total length 3.4 mm. Carapace 1.5 mm long, 1.4 wide, 0.7 behind lateral eyes. First femur 2.2 mm, patella and tibia 2.4, metatarsus 1.6, tarsus 0.7. Second patella and tibia 1.6 mm, third 1.1, fourth 1.8.

Note. Males and females were paired on the basis of matching genitalia, the epigynum having a pointed scape and the

median apophysis of the male a pair of flagella. Also, both have a similar coloration and black rings around the eyes. They were collected near each other.

Variation. Total length of males 2.9 to 3.4 mm. Most males have a dorsal folium on the abdomen. The illustrations were made from individuals from northern Colombia.

Diagnosis. *Tatepeira tatarendensis* is separated from other species placed in this genus by the epigynum, which has the scape on a pedestal (Figs. 217–219), and by the median apophysis of the male, which has a pair of flagella on its distal end (Figs. 222–224).

Natural History. Males were collected in the herb layer in Colombia, in campo-grassland in Mato Grosso, Brazil.

Distribution. Northern Colombia to southern Bolivia and Mato Grosso, Brazil (Map 8).

Specimens Examined. COLOMBIA *Magdalena*: Bahía Concha, Tayrona Park, 10 km E Santa Marta, from low vegetation, 23 June 1985, 1♀ (H.-G. Müller, SMF 36900); Villa Culebra nr. Bonda, 10 km E Santa Marta, Oct. 1985, 3♂, 1 imm. (H.-G. Müller, SMF, MCZ); 1–11 Nov. 1985, 1♂ (H.-G. Müller, SMF). *César*: Velledupar, 4–9 June 1968, 1♂ (B. Malkin, AMNH). BRAZIL *Mato Grosso*: 260 km N Xavantina, 12°49'S, 51°46'W, 400 m, Feb.–Apr. 1969, 1♂ (Xavantina-Cachimbo Exped., MCZ).

Tatepeira itu new species Figures 225–230; Map 8

Holotype. Female holotype from Fazenda Pau d'Alho, Município de Itu, São Paulo State, Brazil, 2 Feb. 1959 (F. Lane), in AMNH. The specific name is a noun in apposition after the type locality.

Description. Female holotype. Carapace yellowish with dusky patches, white pigment underneath center of thoracic area and black rings around eyes. Chelicerae yellowish, proximally dusky. Labium dusky, endites yellow-white. Sternum dusky orange. Coxae yellowish; legs yellowish with narrow brownish to black rings. Dorsum of abdomen white with black patches (Fig. 227); venter with a pair of black patches with some white pigment

posteriorly and to sides (Fig. 228). Posterior median eyes 1.3 diameters of anterior medians, anterior laterals 0.9, posterior laterals 1.2 diameters. Anterior median eyes their diameter apart, 1 diameter from laterals. Posterior median eyes 1.5 diameters apart, 1.5 diameters from laterals. Ocular quadrangle wider behind than in front. Height of clypeus equals 0.2 diameter of the anterior median eye. Abdomen oval (shrivelled), with two humps (Fig. 227). Total length 3.4 mm. Carapace 1.41 mm long, 1.36 wide, 0.85 wide behind lateral eyes. First femur 1.62 mm, patella and tibia 2.31, metatarsus 1.39, tarsus 0.58. Second patella and tibia 1.82 mm, third 1.11, fourth 1.45.

Male paratype. Color as in female. Posterior median eyes 1.3 diameters of anterior medians, laterals 0.9 diameter. Anterior median eyes 2 diameters apart, 2 diameters from laterals. Posterior median eyes 1.2 diameters apart, 1.5 diameters from laterals. Ocular quadrangle slightly wider behind than in front. Height of clypeus equals 0.2 diameter of the anterior median eye. Endite without tooth. Palpal patella without macroseta. First coxa without hook. Second tibia as thick as first. Abdomen as in female. Total length 3.0 mm. Carapace 1.45 mm long, 1.27 wide, 0.75 wide behind lateral eyes. First femur 1.78 mm, patella and tibia 1.98, metatarsus 1.22, tarsus 0.52. Second patella and tibia 1.78 mm, third 0.94, fourth 1.29.

Note. Males and females were matched on the basis of their genitalia, the epigynum with a pointed scape, and the median apophysis with a pair of flagella. Also, they have a similar abdomen shape and similar markings. The species is tentatively placed in *Tatepeira*.

Diagnosis. The heart-shaped frame around the epigynum (Figs. 225, 226) and the shape and armature of the median apophysis separate *T. itu* from other species with similar genitalia. Unlike similar species, the palpus lacks a terminal apophysis and distal hematodocha (Figs. 229, 230).

Paratype. BRAZIL São Paulo: Jabaquara, Cidade São Paulo, 21 Dec. 1945, 1♂ paratype (H. Sick, AMNH).

Specimens Examined. BRAZIL Rio Grande do Sul: Montenegro, 15 Nov. 1977, 1♀ (H. Buckup, MCN 7535).

Tatepeira stadelmani new species

Figures 231–234; Map 8

Holotype. Female holotype from Subirana, Depto. Yoro, Honduras, no date (Stadelman), in MCZ. The species is named after the collector.

Description. Female holotype. Carapace orange with darker orange spots and a median longitudinal gray line; clypeus black. Black band covering anterior median eyes, branching on each side, with upper branch covering lateral eyes, lower covering edge of cephalic region. Chelicerae orange, with darker spots and patches. Labium, endites dusky brown. Sternum brown, lighter in middle toward labium. Coxae orange, mottled brown; legs orange, with irregular narrow brown rings. Dorsum of abdomen white with indistinct posterior gray folium; folium as wide in front as behind, bordered by pairs of reverse parentheses (Fig. 234). Sides with longitudinal black line, which stops abruptly toward dorsum and fades toward venter. Venter colorless with a pair of faint white lines. Dorsum of carapace with a circular thoracic depression. Posterior median eyes 0.8 diameter of anterior medians, laterals 0.6 diameter. Anterior median eyes 0.9 diameter apart, 1.5 diameters from laterals. Posterior median eyes their diameter apart. Ocular quadrangle narrower behind than in front. Height of clypeus equals 0.6 diameter of anterior median eye. Abdomen with pair of lateral humps (Fig. 234). Total length 7.5 mm. Carapace 3.4 mm long, 2.7 wide, 1.5 behind lateral eyes. First femur 4.5 mm, patella and tibia 5.6, metatarsus 3.4, tarsus 1.4. Second patella and tibia 4.9 mm, third 2.7, fourth 3.8.

Note. The abdomen of the holotype is shrivelled and damaged.

Diagnosis. *Tatepeira stadelmani* is similar to *T. carrolli* but differs in having a circular thoracic depression and an epi-

gynum having sclerotized lateral plates with a wide ventral notch in posterior view (Fig. 232).

Tatepeira carrolli new species

Figures 235–238; Map 8

Holotype. Female holotype from Lomalinda, 03°18'N, 73°22'W, near Puerto Lleras, 300 m, grasslands "with patches of jungle and marsh", Depto. Meta, Colombia, 13 Apr. 1986 (B. T. Carroll), in MCZ. The species is named after the collector.

Description. Female holotype. Carapace yellowish with irregular dusky marks, area between median eyes and clypeus gray, indistinctly branching on sides as in *T. stadelmani*. A dark mark in deep, longitudinal thoracic groove. Labium, endites dusky yellow. Sternum dusky yellow with median white streak. Coxae, legs yellowish with indistinct narrow dark rings. Dorsum of abdomen whitish with dusky marks; folium widest in front (Fig. 238); sides with a distinct longitudinal black line fading toward venter; venter with little pigment, a dusky white square between epigynum and spinnerets. Posterior median eyes 0.8 diameter of anterior medians, laterals 0.7 diameter. Anterior median eyes 1.3 diameters apart, 2.1 diameters from laterals. Posterior median eyes 1.2 diameters apart. Ocular quadrangle narrower behind than in front. Height of clypeus equals diameter of anterior median eye. Abdomen with pair of lateral humps and two more pairs of dorsal humps in a line between big humps, also pairs of smaller bulges on sides posteriorly (Fig. 238). Total length 10.5 mm. Carapace 5.2 mm long, 4.5 wide, 2.2 behind lateral eyes. First femur 7.0 mm, patella and tibia 8.4, metatarsus 5.5, tarsus 2.0. Second patella and tibia 8.0 mm, third 4.0, fourth 6.2.

Diagnosis. *Tatepeira carrolli* is similar to *T. stadelmani* but differs by having a longitudinal groove in the thoracic region (Fig. 238) and by having the epigynum with the posterior median plate sclerotized and elevated above the lateral plates, its ventral borders curling toward the sides (Fig. 236).

NOTE

In 1929, Major R. W. G. Hingston (who previously had published 10 books and papers on spiders, as cited in Bonnet, 1945) led an expedition to British Guiana. He had previously been on expeditions to tropical Asia. The 3-month expedition to Guyana included 12 Europeans and 12 Indians. They collected from treetops by climbing trees with spike ladders, spiked boots, pulleys, and observation chairs. A report on this expedition was published by Hingston in 1932 (*A Naturalist in the Guiana Forest*).

Hingston's volume contains 84 pages on the expedition and 151 pages on spider webs and protective adaptations of spiders. Various chapters describe protective and warning devices of insects, especially ants, termites, and caterpillar cases, and nest suspensions of birds and spiders. A chapter on tree roofs reports collecting 2,000 insects. It is stated that all specimens are deposited in the British Museum, Natural History (Natural History Museum, London, England), but the spiders have not been found.

Most important, Hingston includes an appendix of new spider species found. Unable to find a specialist to help him determine species, he gave new names to the spiders observed. Twenty-seven spiders are named and described, and these names are listed in the catalogs of Roewer (1942) and in Bonnet (1955, 1958, 1959). It has been difficult to interpret Hingston's half-page descriptions without specimens. He did not often describe genitalia or other species-specific characters; however, the spiders' webs are illustrated in earlier chapters. Some species and webs are small and appear to be immature. Evidence for this occurs in the descriptions of three new species of *Argiope*, where he records the stabilimenta of immatures (Levi, 1968: 346). The symmetrical webs illustrated were drawn by Hingston with a ruler and may not depict species-specific characters. But some of the webs give information that (along with the description of coloration

of the specimens) provides clues for matching Hingston's names with specimens more recently collected in the Guianas. A list of names and synonymies are given here:

- Epeira moraballii* (pp. 171, 172, 363) is *Metazygia dubia* (Keyserling) (Levi, 1995).
- E. folisecens* (pp. 167–170, 364) is *Hingstepeira folisecens* (see Description section of this species).
- E. sacculifaciens* (pp. 153–155, 364) may be imm. *Micrepeira tubulofaciens* (see Description section of this species).
- E. lodiculafaciens* (pp. 157–159, 365) is a *Cyrtophora* sp.
- E. davisii* (pp. 146–149, 365) is *Spilasma duodecimguttata* (Keyserling) (see Description section of this species).
- E. tubulofaciens* (pp. 150–153, 366) is *Micrepeira tubulofaciens* (see Description section of this species).
- E. essequibensis* (pp. 182, 183, 366) is the male of *Eustala* sp.
- E. nidificans* (pp. 173, 174, 367) is probably an immature *Eriophora fuliginea* (C. L. Koch).
- E. foliplicans* (pp. 175, 176, 367) might be an *Eriophora*.
- Turckheimia moraballii* (pp. 171–175, 200, 368) is *Parawixia kochi* (Taczanowski). NEW SYNONYMY.
- T. tuberculata* (pp. 178, 369) is *Parawixia kochi* (Taczanowski). NEW SYNONYMY.
- Argiope fliargentina*, *A. cuyunii*, and *A. filiinfrecta* are *A. argentata* (Levi, 1968).

Epeira nidificans is 8 mm long, the abdomen a little longer than wide, with three pale yellow bands, the ventral area with a conspicuous quadrate black area. The ventral dark area suggests that the species is an *Eriophora*, probably *E. fuliginea*.

Epeira foliplicans is a relatively large species, 12 mm total length. However, unlike species of *Araneus* and *Eriophora* it has a median light band on the underside of the abdomen, and because it has a retreat it is probably not a *Eustala*.

The species of the genus *Turckheimia* are misplaced, as this name is a synonym of *Cyclosa*. The description of the tubercles on the abdomen places the two species in *Parawixia kochi*, a common species in Guyana.

I have not attempted to place Hingston's six species described in *Cyclosa*, because Neotropical species of that genus still have to be revised.

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INDEX

Valid names are printed in italics. Page numbers refer to main references, starred page numbers to illustrations.

- Actinosoma*, 156
africana, *Spilasma*, 186
akeholmi, *Araneus*, 204
albomaculata, *Micrepeira*, 199*, 200
amazonica, *Madrepeira*, 201, 203*
argentata, *Argiope*, 209
arnolisei, *Hingstepeira*, 165, 167*
artifex, *Spilasma*, 187

baptistai, *Spilasma*, 189*, 190
beatus, *Paphlagon*, 172
beatus, *Pronous*, 172, 173*
beatus, *Pronous*, 178
bristowei, *Larinia*, 164

carrolli, *Tatepeira*, 205*, 208
chelifer, *Pronous*, 169
coccineum, *Spilasma*, 187
colon, *Pronous*, 177, 179*
cuyunii, *Argiope*, 209
Cyclosa, 209
Cyrtophora, 209

davisi, *Cyrtophora*, 188
davisi, *Epeira*, 187, 209
dimona, *Hingstepeira*, 166, 167*
dubia, *Metazygia*, 209
duodecimguttata, *Singa*, 187
duodecimguttata, *Spilasma*, 187, 189*
duodecimguttatus, *Araneus*, 187

Eriophora, 209
essequibensis, *Epeira*, 209
Eustala, 209

felipe, *Pronous*, 173*, 176
filiargentata, *Argiope*, 209
filiinfracta, *Argiope*, 209
foliiplicans, *Epeira*, 209
folisecens, *Aranea*, 164
folisecens, *Araneus*, 164
folisecens, *Epeira*, 164, 209
folisecens, *Hingstepeira*, 164, 167*
fowleri, *Micrepeira*, 194, 195*
fuliginea, *Eriophora*, 209

golfito, *Pronous*, 177, 179*

heteracantha, *Actinosoma*, 157
heteracantha, *Wagneriana*, 158
Hingstepeira, 161
hoferi, *Micrepeira*, 195*, 196
holmi, *Araneus*, 204

intus, *Pronous*, 179*, 180
isherton, *Hingstepeira*, 165, 167*
itu, *Tatepeira*, 205*, 207

kochi, *Parawixia*, 209

laevisternis, *Pronous*, 169
lamentaria, *Aranea*, 187
lamentaria, *Epeira*, 187
lamentarius, *Araneus*, 187
lancetilla, *Pronous*, 176, 179*
lodiculafaciens, *Epeira*, 209

Madrepeira, 200
Micrepeira, 191
minutus, *Pronous*, 169
moraballii, *Epeira*, 209
moraballii, *Turckheimia*, 209

nidificans, *Epeira*, 209
nigripes, *Pronous*, 183*, 184

pachitea, *Micrepeira*, 198, 199*
pance, *Pronous*, 182, 183*
Paphlagon, 168
peje, *Pronous*, 177, 179*
pentacanthum, *Acrosoma*, 158
pentacanthum, *Actinosoma*, 158, 159*
pentacanthus, *Araneus*, 158
Plectana, 158
Pronous, 168
pulcherrima, *Acrosoma*, 158
pygmaea, *Hypsosinga*, 169

quinespinosa, *Cyrtarachne*, 158
quintana, *Pronous*, 173*, 174

riscoi, *Actinosoma*, 158
rubronigra, *Rubrepeira*, 158

sacculifaciens, *Epeira*, 209
schlingeri, *Spinepeira*, 159*, 161
seriata, *Prasonica*, 186
shanus, *Pronous*, 181, 183*
smithae, *Micrepeira*, 198, 199*
Spilasma, 185
Spinepeira, 160
spinipes, *Gea*, 169
stadelmani, *Tatepeira*, 205*, 208
stelligerum, *Acrosoma*, 158

taprobanicus, *Pronous*, 169
tatarendensis, *Aranea*, 204
tatarendensis, *Araneus*, 204
tatarendensis, *Tatepeira*, 204, 205*
tatarendensis, *Wixia*, 204
Tatepeira, 204
tetraspinus, *Pronous*, 169
tredecimguttata, *Spilasma*, 187
tuberculata, *Turckheimia*, 209
tuberculatus, *Pronous*, 174

tuberculifer, *Pronous*, 183*, 184
tubulifaciens, *Aranea*, 197
tubulifaciens, *Araneus*, 197
tubulofaciens, *Epeira*, 197, 209
tubulofaciens, *Epeirella*, 197
tubulofaciens, *Micrepeira*, 197, 199*
tubulofaciens, *Spilasma*, 196
utaca, *Spilasma*, 189*, 190

valle, *Pronous*, 182, 183*
velso, *Micrepeira*, 198, 199*
visite, *Aculepeira*, 204
wixoides, *Pronous*, 178, 179*
wixoides, *Zigana*, 178
Zigana, 168